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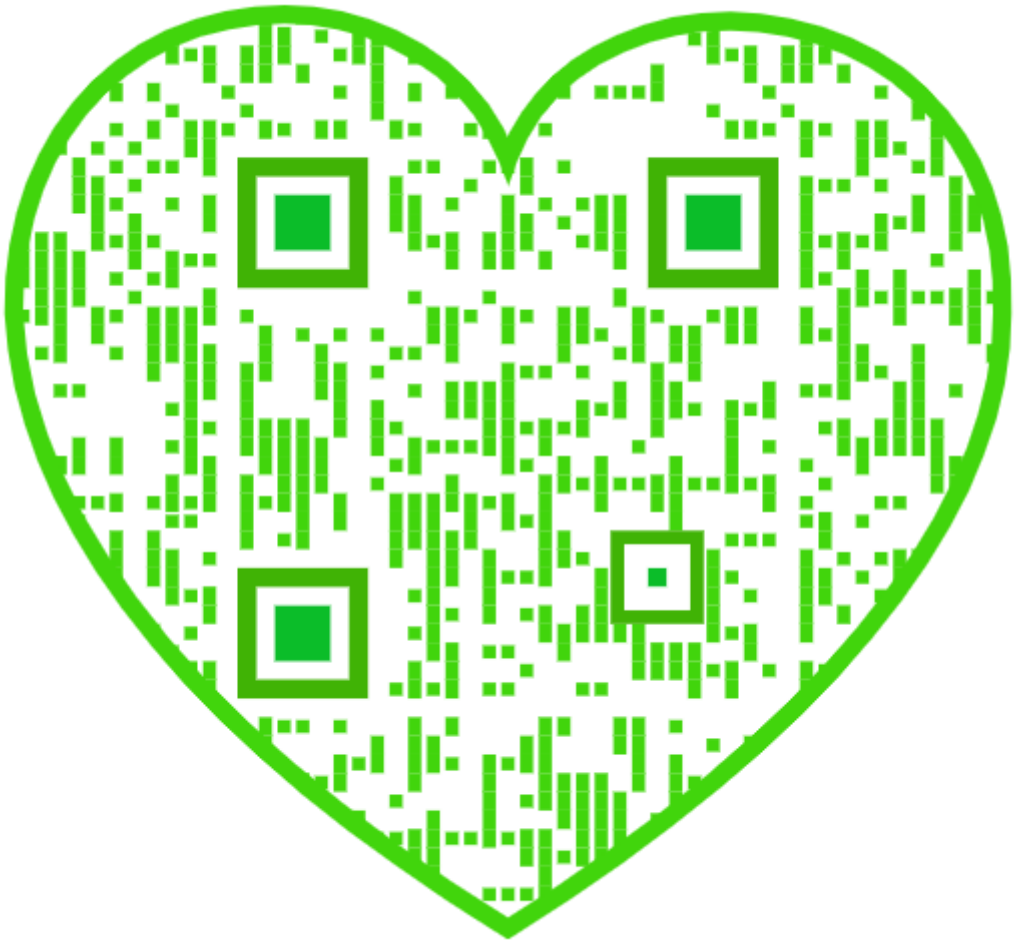

Scientific American.

THE ADVOCATE OF INDUSTRY, AND JOURNAL OF SCIENTIFIC, MECHANICAL AND OTHER IMPROVEMENTS.

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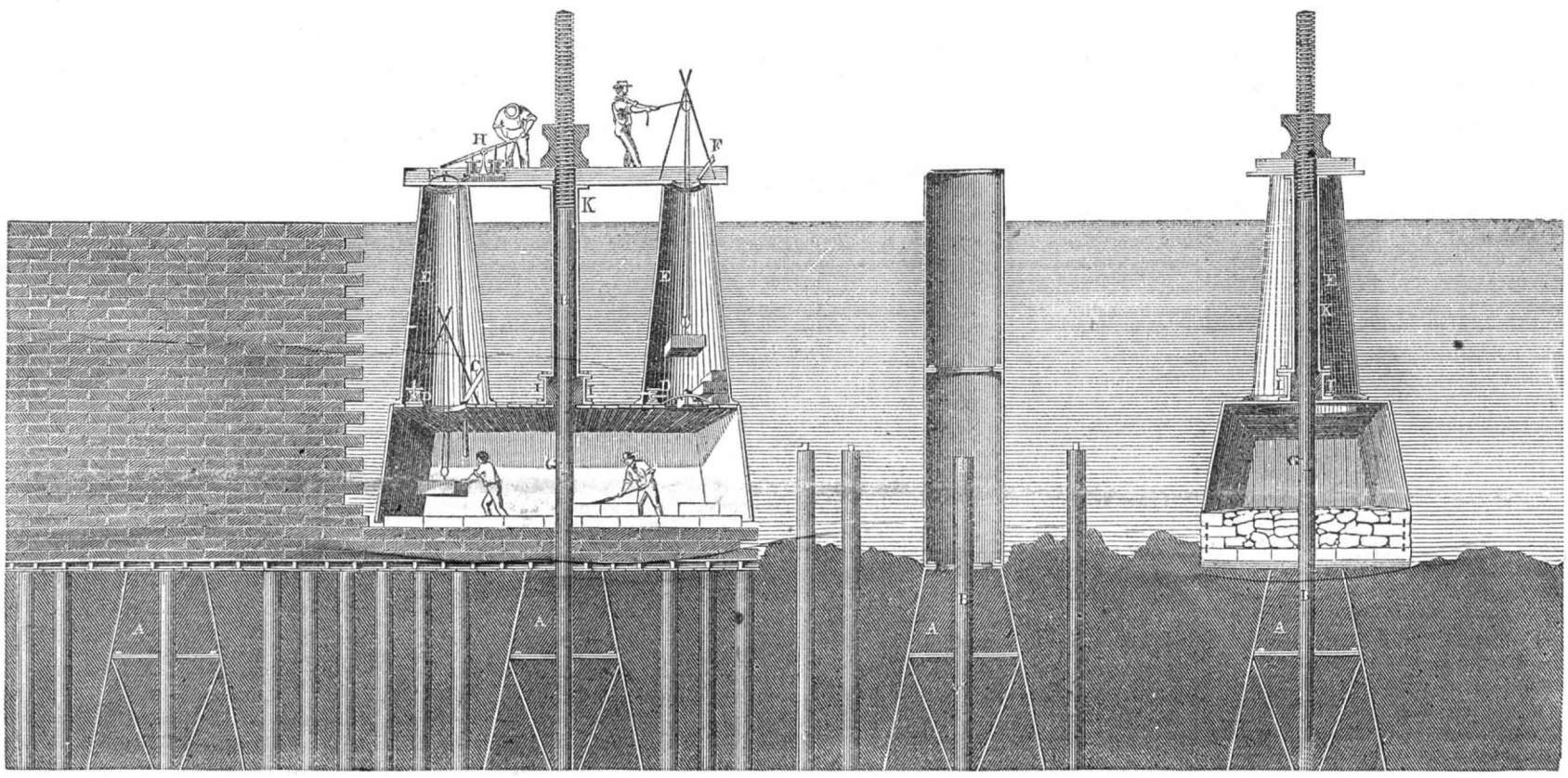
IMPROVEMENT IN SUBMARINE FOUNDATIONS.

This new improvement in the method of constructing Submarine Foundations, is the invention of Charles Pontez, who is at present residing in this city, the owner of the patent for Dr. Potts' process of sinking hollow piles. Hydraulic engineering is the most difficult branch of the engineering art, and presents more practical trouble to the engineering profession than any other. Numerous plans have been devised for working beneath the surface of the water, but only the diving bell, and the coffer dam have stood the test of practical utility. More recently, the method of sinking large cast-iron cylinders, by Potts' Pneumatic Process, which was described on page 161, Vol. 5 Scientific American, is now being used in several works in the United States. Although iron cylinders, ten feet in diameter, have been sunk into the ground many feet below the surface of the water, and which answer admirably as piers for the support of bridges, yet a continuous and unbroken wall cannot so be made, as there must necessarily be some space between the cylinders. It is now proposed to make the iron cylinder subservient to a method of constructing a continuous wall of masonry under water, with almost the same facility and with much greater economy than by the use of coffer dams; the plan has also the advantage of being applicable to localities which will not admit of the construction of coffer dams.

In the illustrations, figure 1 shows a large iron cylinder sunk beneath the bottom of the water. A A A represent a series of these cylinders placed exactly twenty feet apart, and

Figure 2. **Figure 1.** **Figure 3.**



which have already been built on. Figure 2 presents a longitudinal section of an immerser coffer, with its shafts or entrances, and the guide post in the centre. Figure 3 shows a transverse section of the same. Suppose it is required to construct a continuous wall ten feet thick, and in water twenty feet deep; the operation would be commenced by sinking a cast-iron cylinder, 5 or 6 feet in diameter at its base, to a depth sufficient to secure its stability; it is then cleared of the soil within it. In the centre, at its base, is secured an upright iron post, which reaches a few feet above the level of the bottom of the water outside; the post has at its upper end a socket which permits of its being lengthened. The cylinder is now filled with concrete to increase its density, and more fully to secure the upright in its place, so that whatever force may be applied, it cannot be drawn without dragging up with it the cylinder with its contents, and dislodging the superincumbent soil. Fig. 1 shows the cylinder and guide, B. That part of the cylinder above the level of the bottom is now detached, as shown in figure 2. The immersive coffer with its guide post, prevents its rising when immersed. This coffer may be made 20 feet long at its open end, and 6 feet high. Its width may be regulated by the required thickness of the masonry; in its top are two air tight doors, C C, and two taps, D D; these open into the two shafts or ways, E E, each forming a distinct entrance to the coffer, they are elliptical in shape, and are larger at their bases than at their tops, which extend above the surface of the water when the coffer is immersed. The doors, F F, at the top of the shaft, are also air-tight; immediately in the centre of the coffer is a small hollow cylinder, K, open at the top, having a stuffing box, I, at its base where it is connected with the coffer. Through this the guide-post, B, passes. To secure the coffer in its position, it is floated immediately over the sunken cylinder, the guide-post, B, being passed through it, and securely screwed at the joint, G. The coffer is made to sink by loading it or by filling with water by turning the taps, D D. The coffer is then secured to the guide-post at the platform, so that it cannot rise without dragging with it the guide-post and its connections. If the coffer has been filled with water to sink it, the taps are then closed and the water is expelled by forcing in air by means of the pumps, H. Materials are lowered and ingress and egress are obtained to the coffer by the following means:—one of the shafts is filled with materials, into this the men descend and close the upper door, F; the air in the coffer below is of a density proportionate to the depth of water, and its sudden reduction, by opening the lower door, C, would cause the coffer partly to fill; this is obviated by opening the tap, D, at the same time the pumps support the density of the air in the coffer until it is equalized. The door is now opened, and the men descend to work. Whenever it is necessary to have a fresh supply of materials by a like process, the contents of the other shaft are deposited, and so alternately one shaft is open for the reception of materials, while the contents of the other are being delivered below; and the work proceeds and the courses of masonry are laid dry When more space is required the coffer is allowed to rise a space along the guide-post, and so gradually the works continues, course by course, until the surface is reached, and the coffer floats. A small opening has been left in the masonry, around the guide-post, which is now withdrawn by unscrewing it at the joint, G. The coffer is now floated to the next sunken cylinder, which is distant from its predecessor exactly the length of the coffer; the same operation is repeated, and the joints in the masonry, at each twenty feet, are made under the edge of the coffer.

This arrangement for building under the water differs essentially in the details from the diving bell. To cause the diving bell to sink, it must in itself or by the addition of weight be specifically heavier than a volume of water of equal bulk; to enable it to reach the surface it must be divested of a portion of its weight, or a power applied to it greater than the weight which caused it to sink, and on account of its great weight it must necessarily be circumscribed in size. One reason why operating with it is so expensive, is, that it requires the attendance of nine men, while only two can be operating on the work. The immersive coffer can be raised, lowered, or retained at any desired point—the means of controlling it forming a part of the structure itself.

It is obvious that this is an arrangement perfectly practicable, at least in situations where the depth of water does not exceed 30 feet; it now becomes a question as to the advantage it offers of convenience and economy. The cost of the immersive coffer would not greatly exceed the cost of constructing a section of a coffer dam enclosing an equal area but it would serve the purpose of any number of such sections.

In a week or two we shall publish an engraving, showing Mr. Pontez's application of his invention to the building of Dock Warehouses—a very important subject. On that occasion we shall make further remarks on this method of Hydraulic Engineering. Measures have been taken to secure a patent. Mr. Pontez's office is at 34 Liberty street, this city.

Scoundrelism on Railroads.

Some devils in human shape, on the evening of the 6th inst., embedded one end of an iron rail two feet deep on the Hudson River Railroad, near Bloomingdale, for the purpose of striking the locomotive, in order to break it, and kill every one that might be struck. The rail projected above the track in a slanting direction, to be struck by the engine coming down. The locomotive struck it at full speed and was completely disabled, but fortunately no person was hurt. The person guilty of such an act is unfit to crawl abroad on the face of the earth, State Prison for life is too good for him.

We learn by the Pottsville, Pa., Mining Register, that the Reading Railroad, has recently placed upon the road two large coal burning locomotives built after Mr. Mullholland's improvement, and one good working plan connected with them is, they carry an extra water tank each, to save some stoppages for water. This is a hint worthy the attention of some other roads.

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MISCELLANEOUS.

Manufacture of Steel in India.

The Hebrew name of steel, "paldah," is evidently the same word as the Arabic "foulad," which is also in use in Persia, where Indian steel is known by the name of "foulad-i hind." Even now the best Persian swords are made with steel imported from India, and Mr. Wilkinson has ascribed the markings of the famed Damascus blades to their having been made with Indian steel, which has long formed an article of trade from Bombay to the Persian Gulf.

Mr. Heath, at one time the managing director of the India Iron and Steel Company, and whose steel obtained a prize at the exhibition, even says, "We can hardly doubt, that the tools with which the Egyptians covered their obelisks and temples of porphyry and syenite with hieroglyphics, were made of Indian steel." There is no doubt that the ancient Indian temples and fortresses were carved with steel instruments, as they are at the present day. That they made steel which was highly valued in the time of Alexander the Great, is evident from Porus making him a present of about thirty pounds of steel; and still earlier, in the Rig Veda, we read of chariots armed with iron weapons, of coats-of-mail, arms and tools of different kinds, and of bright-edged hatchets.

Mr. Heath describes the ore used as the magnetic oxyde of iron, consisting of seventy-two per cent of iron with twenty-eight of oxygen, combined with quartz in the proportion of fifty-two of oxyde to forty-eight of quartz. It is prepared by stamping, and then separating the quartz by washing or winnowing. The furnace is built of clay alone, from 3 to 5 feet high, and pear shaped; the bellows is formed of two goat skins, with a bamboo nozzle, ending in a clay pipe. The fuel is charcoal, upon which the ore is laid, without flux; the bellows are applied for four hours, when the ore will be found reduced; it is taken out, and while yet red hot, it is cut through with a hatchet, and sold to the blacksmiths who forge it into bars and convert it into steel.

Mr. Heath says that the iron is forged by rehammering, until it forms an apparently unpromising bar of iron, from which an English manufacturer of steel would turn with contempt, but which the Hindoo converts into cast-steel of the very best quality. To effect this he cuts it into small pieces, of which he puts a pound more or less, into a crucible, with dried wood of the Cassia auriculata, and a few green leaves of Asclepias gigantea; or, where that is not to be had, of Convolvulous laurifolia. The object of this is to furnish carbon to the iron.

As soon as the clay used to stop the mouths of the crucibles is dry, they are built up in the form of an arch in a small furnace, charcoal is heaped over them, and the blast kept without intermission for about two hours and a half, when it is stopped, and the process considered complete. The furnace contains from twenty to twenty-four crucibles. The crucibles are next removed from the furnace and allowed to cool; they are then broken and the steel taken out. The crucibles are formed of a red loam, which is very refractory, mixed with a large portion of the charred husk of rice.

Premiums for Agricultural Societies.

The Greene Co., Agricultural Society, Ohio, will hold its Annual Fair in Xenia on the days of the 13th, 14th, and 15th of next month (October.) Among the prizes offered by the respectable gentlemen composing the several committees, there are no less than 30 separate volumes of the Scientific American. A list of those prizes, and what for, have been published, and we have no doubt but those who receive them will be highly pleased. Many of our agricultural societies, especially the spirited ones of Ohio, have been accustomed to award such prizes, and we have had the personal testimony of recipients, in regard to the pleasure and profit they have experienced from such awards. Every volume of the Scientific American is complete in itself; it is a yearly record of American invention and discovery, and no farmer, we are sure, can fail to find something of great importance to him, in almost every number. A book like the Scientific American is of far more value than a medal or diploma. It is true the medal glitters more gaudily, and the diploma hangs more showy upon the wall, but still, for real solid benefit, and as a prize mark for having produced something superior, a volume like the Scientific American, or another instructive book, does more good, and the honor, we think, is equally as great. All Mechanics Institutes in our land would confer greater benefits upon community if they, as a general thing, adopted the laudable example of the Greene County Agricultural Society, of Ohio.

The Flying Ship.

Mr. Rufus Porter issues the following manifesto to the holders of shares in his Flying Ship. We give him the benefit of our circulation gratuitously:—

Report of Progress in the Business of Constructing the Æroport, or Flying Ship, by Rufus Porter.

To the Shareholders:—Since the date of my last report we have had rain every day, which has greatly retarded our progress—the work being of a nature to require dry weather. Nevertheless, I have the satisfaction to announce that the float (the most essential part of the apparatus) is ready for inflation with air, preparatory to the adjustment of the longitudinal rods, rudder, pulleys, replenishing pipes, and saloon wires. Some parts of the work prepared have been admired and complimented by the few who have seen them. The engines are superior both in construction and style. The floor of the saloon is twenty feet in length by six in breadth, and consists of a combination of upwards of one hundred and forty pieces of spruce timber, and strong enough to sustain forty persons; yet its entire weight is only twenty-five pounds. The floor of the engine room is arranged to be independent of the main floor; and the engine and boiler are so arranged as to be at any time instantly disconnected from the wheels, and detached from the saloon, should occasion so require, for the purpose of repair or otherwise.

I have heretofore, and until recently expected to find a cheaper mode of producing hydrogen gas for inflation than the common chemical process, and especially as a gentleman had offered to furnish the gas for less than fifty dollars. But he, for reasons known to himself, having recently declined to fulfil his engagement, I have decided to inflate by the old process, only employing zinc instead of iron, and also employing cubical trunks for generators, instead of barrels or casks.

I have already ordered the materials for inflating, the cost of which will exceed $600. The anticipation of disappointment with regard to the economical mode of inflation induced me to sell more shares than was at first intended. But it is gratifying to consider that none of the shareholders will suffer the least disadvantage by the excess of expense in the construction of this first æroport. That our patience has been tried by a succession of untoward circumstances, I need not hesitate to admit; but still the prospect is bright as ever; the shares are in demand; and two weeks of fair weather will enable me to report progress in a manner more interesting to parties concerned. RUFUS PORTER.

[This is the most momentous project that has ever dawned upon the world since the building of Noah's Ark. We cannot exactly tell how long *it* was in preparing—some say a hundred and twenty years; we know, however, that "Rome was not built in a day," but what is the use of comparing the building of Rome, or even the walls of Troy, to that of Mr. Porter's Flying Ship. It is now exactly seven years since this Flying Ship was illustrated and described in the Scientific American, and at that time it was represented to be a perfectly "fixed fact." We do not know whether or not any shares were sold in the scheme, in 1845, but we know that a scheme was established in 1849, to carry passengers to California by the Flying Ship, and some shares were taken up. Some of those shareholders may have lost patience; we exhort them to exercise that virtue more and more, let them remember the greatness of the project and keep cool: let them remember that it has rained every day since the last Report, and that the projector has been disappointed in not getting his gas for $50, but all these difficulties are about being overcome: a few sun-shiny days will do the job for the "float," and the substitution of cubical trunks for generators, in place of barrels, will do the job for raising the gas. By-the-bye, the discovery of using boxes for barrels, to generate hydrogen gas, is one of the most extraordinary that has ever been made since Dr. Black laid the foundation of modern chemistry. We hope this article will arrest the attention of our Scientific Societies, who are in the habit of awarding medals for great discoveries: the discoverer should be honored as his discovery merits.

The projector is great upon *spruce rods*—140 of them, weighing only 25 lbs., have been so combined as to be able to sustain no less than forty persons. This, we believe, exceeds any of the feats of Queen Mab, and we hope soon to see that most beautiful prediction fulfilled, which was made by the same gentleman in 1849, about skimming along in his balloon, by the skirts of the Rocky Mountains, and landing his passengers among the nuggets of gold in California, in the short space of three days from the time they left New York. It has been said an invention is useful according to its availability; viewed in this light, the Flying Ship is a most useful one, for it has been used to gull the people in our country in various places and at various times, for the past seven years.

Lemon Juice for Acute Rheumatism.

The treatment of acute rheumatism with lemon juice, as noticed in the Scientific American more than a year ago, having been successfully practiced in Europe, has been tried here, and found to be a very effectual remedy. Dr. T. D. Lee, of this city, has communicated his experience with it to the New York Journal of Medicine. He cites two cases, one a male and the other a female who had been subject to severe rheumatism for a number of years, and who were often troubled with acute pains, severe swellings, and could find no effectual remedy. He gave them lemon juice from fresh lemons, in quantities of a tablespoonful in twice the quantity of cold water, with a little sugar, every hour. The effect of the lemon juice was almost instantaneous; in ten days the worst case was cured, and in seven the other was able to go out, and there was a flexibility of the joints after the cure, quite unusual in recovery after other modes of treatment. The "London Medical Times" directed attention to this remedy for rheumatism in 1850, and we would state, that it may answer for one person and not for another. There are two cases recorded in Braithwait's Retrospect, Part 22, 1851, pages 37 and 38, where one patient was effectually cured with lemon juice, after calcium, calomel, and opium had been tried in vain, and the other where lemon juice failed, and the patient was cured with opium and calomel pills, taken along with draughts of the acetate of potash and nitre in a camphor mixture.

Great Artificial Harbor.

The British government are constructing at Dover an artificial harbor for the safety of shipping. It is to consist of a space of seven hundred acres, is to be enclosed by a wall more than two miles in length; more than half of which space will secure a depth of water from 30 to 42 feet at the lowest tide. The wall will be 95 feet wide at the bottom, and 50 at top; the sides will be 18 feet thick, and consist of immense blocks of solid stone, the middle is filled in with artificial stone or concrete. The foundation of this stupendous work is now laying by companies of men who remain several hours, with diving bells, under water. This gigantic display of human power and skill will, when fully completed, cost more than two millions sterling.

The Steamboat Inspectors.

The Republic publishes the following list of appointments of Supervising Inspectors of Steamboats, under the new Steamboat Act:—Robert L. Stevens, of New York; Hiram Barton, of Buffalo, N. Y.; Davis Embree, of St. Louis, Mo.; Benjamin Crawford, of Pittsburg, Penn.; John Shallcross, of Louisville, Ky.; Peyton H. Skipwith, of New Orleans, La.; John Murray, of Baltimore, Maryland; George W. Dole, of Chicago, Ill.

Mr. Stevens is one of the most competent persons for this situation to be found in the United States. If the other gentlemen named are of the same character, the public may expect the most beneficial results from the operation of the new law, if the inspectors do their duty.

Ventilation of Railroad Cars.

The New Haven Courier gives an account of another method of ventilation for railroad cars by a Mr. Waterbury. "It consists," says that paper, "in a connection formed between all the cars by enclosing the platforms, so that the external air with the dust, smoke, and cinders, are entirely excluded from the usual ways of ingress The front of the baggage car is open, but protected from the smoke of the locomotive by a screen; the air rushes in through the front of the car, and circulates freely through the whole length of the train."

We cannot conceive how the screen is able to keep out the smoke and dust, it cannot do it. A correspondent of the "New York Daily Times" claims what is known by the name of Paine's Ventilator, as the invention of Nelson Goodyear, recently deceased—the principle of the invention—not the specific mode is claimed, and it is asserted that all modes of ventilation, embracing that principle, is an infringement of Goodyear's patent.

J. B. J. Hadaway, of East Weymouth Mass., proposes a plan for removing the smoke nuisance of cars, which appears to be new and more plausible than others. He conducts the smoke and exhaust steam through two pipes—one on each side—from the boiler and engine through the water tank of the tender, and through side tubes to the back end of the train. The water in the tank is thus heated, and the smoke carried past each ear.

Perpetual Motion Again.

It is said that Mr. J. Dickens, of Pendleton Co., Ky., after some three years' study, has discovered the principle of perpetual motion. Mr. D. has written to Congress, and steps will soon be taken to apply it to machinery. He has been offered as high as five hundred thousand dollars for his discovery, but will not sell.—Ex.

[He would have sold had he got the offer. Perpetual motion is a hallucination with some men; no man of science would trouble his head with it.

Hot and Cool.

A correspondent of the Liverpool Albion says that some years ago there was a Jerusalemite individual in Paris, who, in the presence of Dr. Robertson and all the chemical savans of the day, got into an oven and sang a song while a goose was being cooked.—When he went into the oven the pulse was 72, and rose to 130. At the second experiment it rose to 176, the thermometer indicating 100 of Reamur. At the third experiment he was stretched on a plank, surrounded by lighted candles, and then put into the oven, the mouth of which was this time closed. He was there five minutes, when the spectators cried "Enough!" Accordingly the door was opened; out he came of the fiery gulf, and, with his pulse at 200, jumped into a cold bath, and became as cool as a cucumber immediately after.

Weevil in Wheat.

A correspondent directs our attention to an insect which is now destroying the wheat in some of the grist mills in Pennsylvania, and wishes for information to remedy the evil.

A patent was taken out, about two years ago, for destroying insects in wheat, by moistening the wheat with a solution of 1 part by weight of sulphuric acid to 100 of water. It is said that this will not injure the wheat, but that it will be fit for grinding in a few hours afterwards, as a considerable heat is generated by the action.

Another plan, and one which we think would effect the object completely, would be to drive a current of hot air through the wheat. The hot air should be heated as high as 250° Fah. The air could be drawn through tubes placed in a furnace, and forced into the room where the wheat is placed.

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For the Scientific American.
To Millwrights.

I shall not endeavor to entertain you by a repetition of the old portable-mill story, about saving power by using small mill stones instead of large ones, for it is not true, and no man can prove it. Some questions may be asked, however, about certain principles in grist mills, which have been used and handed down from time immemorial, though they have long since been discarded from all other machinery. The common bail and driver, so-called, or its equivalent, which is invariably used to connect the runner stone to the spindle, in reality does not subserve any other purpose, more noticeable, than that it provides a mill with the absolute necessity of wearing out and destroying itself whenever it is in operation. Now, is it common sense so to attach the running stone to the spindle, that whenever it is in operation the dress in the stones will unavoidably be more worn by their contact with each other than by grinding the grain? "What is the advantage of a vibrating mill stone?" is a question which every millwright, who has not been brought up to believe in their necessity, would naturally ask himself, every time he saw such absurdities, and the answer—"no use at all,"—would also be as natural as it is true and undeniable. Or where is the economy in consuming a considerable part of the power of a water-wheel or steam engine in grinding mill stones together, when the only object is to grind grain?

These seemingly impertinent objections to ordinary mills are not ventured on the very common over-estimate of some beautiful mechanical theory, but from an actual knowledge of a better way, the practical value of which has been thoroughly tested for a number of years past in more than a hundred instances.

EDWARD HARRISON.

New Haven, Ct., Sept. 3rd, 1852.

Sensation of Heat.

MESSRS. EDITORS.—It sometimes happens that, in grinding a piece of steel, such as a tool for turning iron, and so holding it as to produce what is technically called a fine "chatter," or vibratory movement of extreme rapidity, producing a musical note of the highest appreciable pitch, there will be communicated to the hand, by such vibration, a sensation not at all distinguishable from ordinary heat; and although I have never known any one burned by such process, yet the sensation is sufficiently painful to cause one to relax the hold for fear of being burned.

I am not able to point out all the circumstances necessary to insure the result, I only know, that in grinding cold steel, it sometimes appears hot, when in contact with the stone, but cold the instant it is removed. Has the fact been noticed by scientific men? Does it not have a bearing on the undulatory theory of heat? J. B. HARTWELL.

Woodstock, Vt., Sept. 6, 1852.

[The same phenomenon has been noticed by others, and a short communication on the subject will be found on page 18, Vol. 7, Scientific American; it is a subject of some interest. Let us ask the question, "What is heat?"—The only answer we can give, is, it is a certain action in certain bodies, which produces a sensation—an action it must be, which we call "heat."

Pigeons.

The late Bishop of Norwich, in his "History of Birds," relates that fifty-six pigeons were brought over from a part of Holland, where they are much attended to, and turned out from London at half-past four in the morning. They all reached their dove-cotes at home by noon; but one favorite pigeon, called Napoleon, arrived about a quarter after ten o'clock—having performed the distance of three hundred miles at the rate of above fifty miles an hour, supposing that he lost not a moment, and proceeded in a straight line. It appears from various trials that the possible flight of a carrier pigeon is about sixty miles an hour.

The Cranberry.

We have received a printed account of the cultivation of the cranberry by Sullivan Bates, of Bellingham, Mass., who cultivates and sells the plants. This fruit is now cultivated on farms, even on dry lands; a few years ago, all that were gathered wild from the swamp. Mr. Sullivan plants in drills twenty inches apart in hills of seven inches. He has raised 400 bushels on one acre.

Chocolate.

Although chocolate is not a daily necessary like tea and coffee, yet the large quantity consumed entitles it to some notice. Chocolate is made from the beans of theobra cacao, a small tree of the malva-family, indigenous to tropical America, and the West Indian Islands, which bears a very small flower, not 2 lines in diameter, and a disproportionally sized gourd-like fruit, which is 4 inches thick and 10 inches long. It contains in a reddish-white agreeably tasted pulp, 25 to 40 kernals or cacao beans, each covered with a skin, with which they are brought into commerce.—When the fruit is ripe, the beans are separated from the flesh and heaped up in pits or ditches covered with boards, where they are left for some days under frequent inspection. A sort of fermentation is thus set up in them which removes a good deal of their bitterness and renders them darker in color; they are subsequently dried in the sun. There are a great many varieties; that from Caraccas is the best, and the West Indian the worst. The beans of cacao have not been thoroughly examined; they are only known to contain a peculiar mild fat, the cacao butter, to the amount of 43 per cent. according to Bousingault, and 53 per cent according to Lampadius. Both experimenters found a considerable quantity of albumen, a kind of tannic acid, and some starch among the more remarkable ingredients. Lampadius' analysis of the cacao of the East Indies does not include the husk, which forms about 15 per cent. of the weight of the beans.

Woskresensky has proved that the beans also contain a peculiar ingredient, similar to caffeine, which he called theobromine. But this substance which is still imperfectly known, differs in composition ($C_{14}H_{16}N_8O_4$,) from the others, containing more nitrogen (35 per cent.,) although in taste it exhibits a remarkable resemblance to caffeine. It cannot be sublimed without decomposition.

In preparing chocolate the cacao beans are roasted in a cylinder similar to those employed for roasting coffee. In this operation the aroma is developed, the bitterness diminished, and the beans are rendered fragile. They are broken under a wooden roller, and winnowed to remove the husk entirely. They may then be reduced to a soft paste in a mahine consisting of an annular trough of granite, in which two speroidal granite millstones are turned by machinery, with knives attached to return the ingredients under the rubbing surface. An equal weight of sugar is here added to the paste, which is finally rendered quite smooth by being ground under horizontal rollers on a plate of iron, heated to about 140° Fah.

The preparation of cacao consists in roasting, peeling, and grating the peeled beans in a warmed rasping apparatus or chocolate machine. The flour of the seeds forms with the liquid fat (melting at 104° Fah.,) a kind of paste which congeals to a solid cake in the moulds.

Population of the United States.

George W. Smith, in a paper recently read before the Franklin Institute in speaking of the density of population already attained in some parts of the United States, referred to a map which he had constructed, which represented a curious illustration of this density. He traced the boundary of an area as large as the kingdom of Great Britain, as follows:—Commencing on the Atlantic, at the mouth of the St. Croix river, ascending it to the head; from this point a line was drawn to the Saco, where it debouches from the White Mountains in New Hampshire, thence to Sandy Hill on the Hudson, in New York; thence to Oswego on Lake Ontario, including all south of it in New York, and all of New Jersey, Pennsylvania, and Maryland, north of the Blue Mountains; along this to the Potomac in Maryland, thence by the latter river to Washington, D. C., thence by a straight line to New Haven, on Long Island Sound, and thence by the sea to the place of beginning in Maine. The included area will be 84,000 square miles, a close approximation to the kingdom aforesaid, and the population of this area at the present moment, including the usual increase since the census, is 8,180,000 in round numbers, an amount equal to that of Great Britain at the accession of George III, and about one-third of that at the present day. The present population of the American area, within the boundaries just mentioned, is twice as great as the average population of eastern or northern Europe, although much less of course, in comparison, than the British, French, German, Austrian, and Italian countries, &c.

A line drawn from Massachusetts Bay to the Potomac, almost in a straight line, passes through more numerous and more populous cities than can be found on a similar line of about 400 miles in extent, drawn on any part of the globe, with the exception of China; London must also be excepted. The population of New York, with its suburbs on Long Island, New Jersey, &c., included in a circle of twelve miles radius round the City Hall, (as the metropolis of London is in a circle of twelve miles round St. Paul's,) is at the present moment, (1852,) 860,000, New York will contain more than one million.

Recent Foreign Inventions.

PAPER.—Jeane A. Farina, of Paris, patentee.

This invention consists in obtaining pulp for the manufacture of paper from the plant called spartum or water-broom.

The patentee takes the plants, and having separated the roots from the stems, he cuts the latter into pieces of from four to six inches long, which pieces he submits to the operation of barking or stripping. He then steeps them in water rendered alkaline with American or other potash, in the proportion of about 2 per cent. of the weight of the stem operated on, and continues the steeping about four hours, during which time the temperature of the solution is raised by steam. As soon as the steeping is completed, and the material is cold, it is removed to a crushing mill, and is then washed in water acidulated with nitric or sulphuric or muriatic acid, after which it is bleached (by liquid chlorine or the vapor evolved from chloride of lime, wetted with muriatic acid) and again washed, when it is in a fit state to be used alone or mixed with cotton or linen pulp, according to the processes ordinarily followed in the manufacture of paper.

The roots of the plant may be treated in a similar way, only as they are much harder than the stems, a greater quantity of potash will be required in the steeping process and of acid in subsequent washing; and the bleaching process will also occupy a longer time. It is to be observed, however, that the pulp produced from the roots will not in any case be so white as that from the stem.

ARTIFICIAL STONE, &c.—Owen Williams, of Stratford, England, patentee.—This improvement consists in certain modes of manufacturing compositions to be used for railway construction and building purposes generally. The following are the proportions of ingredients used in preparing one such composition:—

180 lbs. pitch, 4½ gals. dead oil or creosote, 18 lbs. rosin, 15 lbs. sulphur, 45 lbs. finely-powdered lime, 180 lbs. gypsum, 25 cubic feet sand, breeze, scoria, bricks, stone, or other hard materials broken to pieces, and passed through a half-inch sieve.

The sulphur is first melted with about 30 lbs. of the pitch, after which the rosin is added, and then the remainder of the pitch with the lime and gypsum, which are introduced by degrees and well stirred, and the mixture brought to boil. The sand, or broken earthy or stony material is then added, and the whole mass well stirred, after which the dead oil is in a fit state to be moulded into blocks. In order to consolidate the blocks, pressure is applied to them in the moulds. The patentee gives also the proportions of the above materials to be used as a composition for laying pavements, as a cement for uniting to each other blocks of the first-named composition when used for building purposes, and as a coating for bridges, the roofs of buildings, &c. —[London Mechanics' Magazine.

Great Iron Steamer.

We see it stated in a great number of our daily papers, that the Messrs. Burns, the large stockholders of the Cunard line, have contracted for a huge iron steamer of more than 3,000 tons burden, with engines of more than 1,000 horse-power each, to be built by R. Napier. It is also stated that she is intended for the Cunard Line of Royal Mail Packets; this, however, is a mistake, as the government will accept no iron steamer to fulfil a mail contract, such a vessel may be intended for a passenger line, but not for the mails.

Poison of Fusil Oil---Chloroform.

Some very interesting experiments took place in the laboratory of Dr. Jackson, the eminent chemist, on the 10th inst. They were made in the presence of several scientific gentlemen of Boston. Dr. Jackson placed a rat under a large glass receiver in the wire rat-trap in which it was caught, and a small piece of cloth, about the size of a man's hand, was moistened with chloroform, and placed on the top of the rat-trap, and the receiver placed on a marble slab. The rat, in five minutes afterwards, fell down in a state of insensibility, the only sign of life exhibited was its gasping for breath once or twice.

After the lapse of eight minutes, the rat was removed from the receiver and placed in fresh air; it soon revived, with the exception of its hind legs, which remained in a paralytic state for half an hour, dragging its hind parts along by means of its fore paws; this phenomena was also exhibited some months ago at South Boston, where Dr. Jackson etherized the Puma, or South American Lion, and cut off its claws close to the quick with perfect impunity—cutting off two of the claws of the hind feet of the lion after it had recovered the use of its fore-paws. The Dr. also stated that he had observed the same phenomena at the Grotto del Cani, near Naples, where dogs were subjected to the carbonic acid gas, which is emitted there; the dogs were compelled to drag their hinder extremities by means of their fore-paws, till they had recovered from the effects of the gas.

The rat, after the first experiment, was allowed the use of fresh air for one hour, to recover from the effects of the chloroform; and being found quite lively and animated, at 5 o'clock P. M. the final experiment of subjecting it to the poisonous compound was made. The rat was placed under a receiver, and a cloth wet with an Amyl compound, found by Dr. Jackson in pure fusil oil (of whiskey), was now placed on the top of the rat-trap in the same manner as when the chloroform was used. The rat, after being ten minutes in the receiver, exhibited violent convulsions, like those produced on the human body by all narcotic poisons, Five minutes more elapsed, and the rat fell down in the trap apparently dead; it was taken out and revived partially in the fresh air. It was again placed under the glass receiver, and exhibited now a short quick breathing, and a palpitation of the heart and twitching of the extremities; the breathing was now apparently slower and more difficult, till life became extinct without further struggle.]

In these experiments, a very large glass receiver, capable of holding several gallons of atmospheric air, was used. The Amyl compound, discovered by Dr. Jackson, is not very volatile in its nature, therefore death did not ensue in so short a period of time as would have been the case with a more volatile substance, like chloroform, to convey it to the respiratory organs. The rat is an animal that will exist in sewers filled with mephetic vapors dangerous to human life. A common turtle, which is more tenacious of life than the rat, was placed under the receiver, and was killed in a much shorter period of time.

The slime of snails forms a cement for glass and porcelain; it is a limous composition, of the same nature as the substance of which their shells are composed.

The "Zanesville Courier" has been shown a miniature copper teakettle, made of a half cent piece, by Mr. Hercules Boyd, a young mechanic of that city.

The steamboat Reindeer, on which the explosion took place at Malden, a week ago, took fire and was burned down on the 11th inst., at that place, where it was lying for repair. Unfortunate boat!

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NEW INVENTIONS.

Hat Bodies.

Francis Thomas, of the city of New York, has invented a new improvement on machines for making hat bodies, the nature of which consists in placing a cap, made of wool or cotton, over the "former," which is constructed of wires, forming a conical frame. The fur to make the hat body is thrown upon the cap on the "former," by a picker having a reciprocating motion, and the vacuum is created in the "former" in the usual way by a rotary fan. The fur thrown from the picker on the cap spoken of, adheres to it, and when sufficient fur has been distributed, the cap is taken off the "former," and the body of fur is hardened by compression merely, without the aid of water, as is done in the usual mode of making such fabrics. Measures have been taken to secure a patent.

Improved Carriage Wheels.

George Poe, of Ellicott Mills, Md., has taken measures to secure a patent for an improvement in making carriage wheels, which improvement consists in jointing and bracing the fellies by means of a metal cap of the same depth of a felly, and having ears running out each way for the fellies to rest on. Each cap has a circular opening through its centre, for the reception of the tennon of the spoke, and as the fellies are fitted into recesses in the caps, a very strong wheel is thus produced.

Improved Grain Separator.

Peter Conrad, of St. Louis, Mo., has taken measures to secure a patent for an improvement in grain separators, which improvement consists in the use of an air chamber in direct communication with the fan, and expanding spouts with adjustable valves in combination with gates or slides, by which the grain is cleared in a superior manner.

Improvement in Looms.

E. W. Nichols, of Worcester, Mass., has invented a new improvement in looms, which improvement consists in a self-acting contrivance for regulating the friction which is given to the warp beam for the purpose of producing tension on the warp, whereby the said tension is made to act uniformly at all times, whatever quantity of yarn there may be on the beam. Measures have been taken to secure a patent.

Rings for Spinning Frames.

Geo. White, of North Scituate, R.I., has taken measures to secure a patent for a new and useful tool for making rings for spinning frames. The nature of the invention consists in placing in a stock a series of cutters in such a manner that, by properly operating or moving the stock, the cutters will act upon the metal ring, and cut and finish it in the required form. The stock is provided with a water passage, which runs longitudinally through it, and conveys water to the ring, keeping it moist, cool, and well lubricated.

Improved Wagon Brake.

Perry Dickson, of Blooming Valley, Pa., has taken measures to secure a patent for a very simple and excellent brake for wagons and carriages. It simply consists in so connecting double cranks to the inner end of the pole or shaft of a carriage or wagon, and connecting the cranks to a friction brake for the face of each wheel, in such a manner that the least backing up of the draught animals brings the brakes up against the face of the wheels, and so presses them that they cease to revolve, and merely slide. It is a useful improvement for hilly countries, and cannot fail to commend itself to all whom it may concern.

For Daguerreotypists.

J. F. Mascher, of Philadelphia, has taken measures to secure a patent for a new improvement, whereby a case containing a double daguerreotype picture is made into a stereoscope, and yet the outside case remain exactly as it has usually been constructed. Mr. Mascher unites a supplementary flap or leaf to fold in the inside of the case, and in this he places two lenses, whereby the pictures in the frame are made to appear to the person who looks through the lenses, one solid picture by binocular vision.

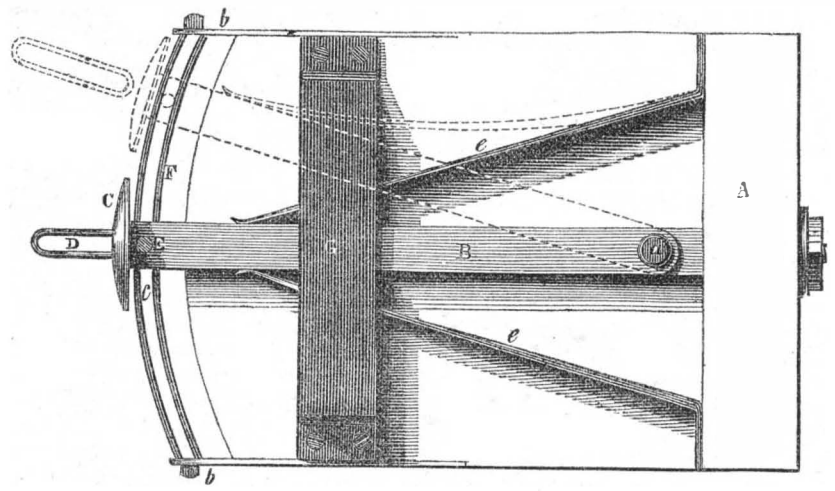
Life Buoy for Steamboat Accidents.

Our attention has been directed to a good Life Buoy, constructed by G. W. Gerau, of the firm of Flanders & Gerau, sail makers No. 88 South street, this city. It is simply a trunk of cork covered with painted canvas, and can be made very cheap. A number of such articles can be hung by loops around rooms, or alongside of a vessel, to be used in cases of emergency. One, three feet long and nine inches in diameter, will support four persons in the water; one sufficient to do this can be seen in our office; there is no patent on the apparatus.

Long's New Bridge.

M. M. White, of this city, is erecting the Nashua and Nashville, N. H., iron truss bridge, to which we referred in No. 42. The plan is that patented by Col. Long in 1839. The clear span is 140 feet.

TURNER'S RAILROAD COUPLING.---Fig. 1.

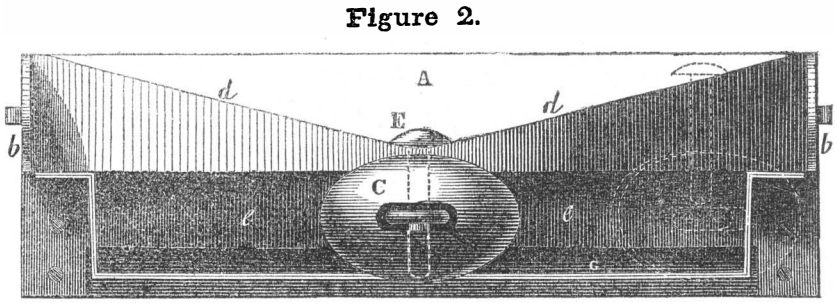


The accompanying engravings are views of a coupling for railroad cars, invented by James Turner, of East Nassau, Rennselaer Co., N. Y., and for which a patent was granted on the 20th of last July (1852.) Figure 1 is an inverted plan of one end of a car having the improvement attached, and figure 2 is a front view. The same letters refer to like parts.

These improvements are chiefly intended to cause the locomotive or any car of a train that may, by accidental means, get off the track, immediately to detach itself from the rest of the train, by which means it will be preserved from any material injury itself, and likewise be prevented from drawing others off the track, or injuring them The said improvements also accomplish another object, viz., that of allowing a close connection to be made between the cars, and the buffer springs to be dispensed with. They consist simply in connecting the inner end of the traction bars, to which the buffers are attached, to the car in such a manner as to allow the buffer to move sideways, and in attaching to the ends of a car a transverse bar whose upper side inclines upwards from the middle towards the sides of the car; upon this bar the head of the coupling pin rests—the form of coupling employed being the common link and pin coupling. When the engine or a car gets off the track, it drags the buffer of the next car sideways, and the coupling pins being also moved sideways are raised by their heads passing up the inclines on the transverse bar, until they are drawn from the links, and the detached engine or car is uncoupled.

A represents part of the platform or floor frame of a car; there are two traction bars, B, which, instead of being rigidly attached to the car as is commonly the case, are jointed by a pin, *a*, and have springs, *e e*, which are secured to the car, bearing on each side to keep the buffer in line with the middle of the car; C is the buffer; D is the coupling link, and E, one of the coupling pins which passes through the traction bars at the back of the buffer and through the link in the common way; G is a guide for the traction bars; F is the transverse incline bar, which is secured to the car close behind the buffer, and close above the upper traction bar; its form is that of an arc described from *a*; its ends are fitted in slotted cheeks, *b b*, attached to the sides of

Figure 2.



the car, or may be otherwise secured; there is a vetrical slot, *c*, extending nearly from end to end of it, and through this slot the coupling pin passes, its head resting on the bar on the two sides of the slot; the inclined form of the upper side of the bar is shown best in figure 2, by referring to which it will be seen that its depth is very slight in the middle, but that it increases in depth towards the ends, this increase in its depth is all on the upper side, which give it two inclines, *d d*.

It has long been a desideratum to make a close connection or bring the buffers close together, and at the same time to dispense with the bumping spring, but this is impossible where the buffer and traction bars are stationary, as in turning curves the cramping of the buffers could not be prevented. By jointing the bars and applying the side springs, *e e*, the close connection can be made and the bumping spring dispensed with, as the bars and buffer will yield sideways, and the springs always return them in line with the centre of the car.

The incline bar, F, may be employed either with or without the bumping spring, and in combination with any movement of the buffer and traction bars sidewise, and may be straight or curved horizontally to suit the movement of the pin.

More information may be obtained by letter addressed to the inventor.

Hind the Astronomer.

We have seen it recoided in a number of our exchanges, that Mr. Hind discovered another planet on the 22nd of last month. It may be interesting to many of our readers to know who this Mr. Hind is, and something about what he has done. He is the discoverer of three comets, six ultra zodiacal planets, and fifteen variable stars. He is the author of many papers on astronomy, and has computed the orbits of 70 planets and comets in ten years. He is but a young man yet—only 29 years of age. He was born in Nottingham, England, in 1823, where his father was a lace manufacturer. He received his education at private schools, and never was in a university. As it respects astronomy, he is entirely self-taught, but he has been an astronomer since he was six years of age, for even that early, it was his delight to go out and gaze upon the stars in a clear night. At the age of 21 he was appointed, on the recommendation of Mr. Airy the Astronomer Royal, Observer at the private observatory of G. Bishop, London, but at the age of 17 years he was employed as an assistant in the Greenwich Observatory. Considering his age and his opportunities, he is perhaps the greatest astronomer in the world.

Competitors for the Prizes.

We do not require that competitors for the Prizes offered by us for the largest number of subscribers, should confine themselves to one particular locality. Some have written to us under the apprehension that the list must be made up from one post-office. The paper will, in all cases, be mailed wherever a subscriber can be procured.

Connecticut Freestone Quarries.

The great mass of freestone which is employed for building purposes in this city, comes from Connecticut. The quarries are situated on the East bank of the Connecticut river opposite Middletown, and no less than 1500 persons are continually employed on them. This rock lies in beds or strata, which are not horizontal, but incline or dip a few degrees towards the South and East. It is composed chiefly of siliceous sand, the grains of which are firmly cemented together, but it also often contains pebbles of considerable size. The strata are found divided at irregular distances by fissures or joints, which extend downwards to unknown depths, and horizontally as far as the surface earth has been removed. At the top they are usually a little open,—at least those running in the general direction of north and south—but downward, they become very light. Though seldom exactly vertical, they never incline very much from this position. These joints, as may readily be conceived, aid the workmen much in removing the stone from its ancient bed.

"Recently," says a correspondent of the New York Journal of Commerce, "as the workmen have penetrated the lower strata in the deepest quarry, a singular occurrence has occasionally been observed, indicating that some of the strata are not entirely at rest in their present position! This consists in a slight movement of the strata, in certain cases, their native bed! In order, it possible, to convey a clear idea of the facts observed, we will suppose the principal joints to run north and south, and to be crossed by others nearly at right angles, both sides being nearly vertical. To remove the stone from its bed advantageously, the workmen often sink a channel or groove a foot wide and twenty-five to fifty feet in length, quite through one of the strata, which may be from two to six feet in thickness. When this is done, advantage is usually taken of one of the seams or joints, by the side of which, and parallel with it, the channel is cut, and the broken stone thus dug up removed.

Now, when this is done by the side of an east and west joint, when the channel has been nearly through the stream, a movement of the stratum commences, and the vertical walls of the channel that has been cut approach each other with an enormous force, crushing between them the stone still remaining at the bottom. The approximation of the walls has sometimes been, as estimated, as much as four inches—in some instances the movement has taken place suddenly, with a single tremendous crush; but at other times it has been slower, the stone at the bottom of the channel gradually yielding as the workmen have plied their picks.

It is remarkable that the phenomenon is observed only when the channel is cut in an east and west direction, indicating that the pressure is in a direction at right angles to this, or north or south. After such an occurrence, all the joints parallel to the channel, for a distance of many feet, are found to be slightly opened."

The Albany papers give accounts of the ruins of a city which contained about 15,000 inhabitants, and which have been discovered in the forest by a surveying party in Essex Co., this State, a few miles from Ticonderoga. It is stated that the ruins of more than 200 chimneys are still in a good state of preservation. We simply believe the story to be a new invention, but not a useful one.

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Scientific American

NEW-YORK, SEPTEMBER 18, 1852.

Our New Volume.

The next year will be unusually attractive and interesting to the readers of the Scientific American. The great Exhibition to be held in New York, in 1853, will enable us to illustrate an extraordinary number of new machines, and as a standard work for binding at the year's end, the present, being the commencement of a new volume, forms a good opportunity for engineers, mechanics, millwrights, farmers, manufacturers, and all lovers of science and art, to become subscribers.

The New Safety Steamboat Law.

The new law passed by the late Congress for the better protection of life and property in vessels propelled in whole or part by steam, is very comprehensive, and if its provisions be faithfully carried out, travelling by steamboat will be exceedingly safe. But here is where the difficulty lies; we may make as many laws and penal statutes as would build a pile high as Mount Blanc, and yet they may all be no better for the protection of life and limb than "the baseless fabric of a vision." The safeguards for the protection of life on board of vessels propelled by [illegible] not good laws merely, but good laws [illegible]fully executed. Here we have a good law, but will it be faithfully executed? that is the important question. The responsibility of its execution will rest with the inspectors of the various districts; they have supreme authority—almost boundless—to carry out its requirements and enforce its demands.

No register, license, nor enrollment, shall be granted to any steamboat, unless it first shall give satisfactory evidence that all the provisions of this law have been complied with, and those who are to see to it, that the provisions of this law must be complied with, are the inspectors. In every district there is to be a supervising inspector, and along with him, there are to be associated the collector, or other chief officer of customs, and the judge of the district court of the United States, who, for the district in each of the following collection of districts, namely, New Orleans and St. Louis, on the Mississippi river; Louisville, Cincinnati, Wheeling, and Pittsburgh, on the Ohio river; Buffalo and Cleveland, on Lake Erie; Detroit, upon Detroit river; Nashville, upon the Cumberland river; Chicago, on Lake Michigan; Oswego, on Lake Ontario; Burlington, in Vermont; Galveston, in Texas; and Mobile, in Alabama; Savannah, in Georgia; Charleston, in South Carolina; Norfolk, in Virginia; Baltimore, in Maryland; Philadelphia in Pennsylvania; New York, in New York; New London in Connecticut; Providence, in Rhode Island; Boston, in Massachusetts; Portland, in Maine; and San Francisco, in California, shall designate two inspectors of good character and suitable qualifications to perform the services required of them by this act, within the respective districts for which they shall be appointed—one of whom, from his practical knowledge of ship-building, and the uses of steam in navigation, shall be fully competent to make a reliable estimate of the strength, sea-worthiness, and other qualities of the hulls of steamers and their equipment, deemed essential to safety of life, when such vessels are employed in the carriage of passengers, to be called the Inspector of Hulls; the other of whom, from his knowledge and experience of the duties of an engineer employed in navigating vessels by steam, and also in the use of boilers, and the machinery and appurtences therewith connected, shall be able to form a reliable opinion of the quality of the material, the strength, form, workmanship, and suitableness of such boilers and machinery to be employed in the carriage of passengers, without hazard to life from imperfections in the material, workmanship, or arrangement of any part of such apparatus for steaming, to be called the Inspector of Boilers; and these two persons, thus designated, if approved by the Secretary of the Treasury, shall be from the time of designation, inspectors, empowered and required to perform all the duties required by the law. Every steamboat is required to have the spaces surrounding the boilers safe from ignition; the boilers are to be tested by hydraulic pressure, at least once per annum; each boat must have some kind of life-preserver for each passenger; metallic life-boats must also be provided.—Vessels, according to their tonnage, must have from one to three force pumps on deck for the extinguishment of fires, and there must be a good supply of buckets. Every engineer must be examined by the inspectors and get a certificate of qualification before he can be employed to take charge of an engine,—and the safeguards for carrying only a certain amount of steam, and to have good gauges, are full and complete, but, at the same time, as we have said in substance before, this law will be a mere incubus upon the statute book if good inspectors are not appointed. Those inspectors should be men of good qualifications respecting skill and knowledge, and high above all, stern integrity—the energy and iron will to do their duty.

We do not publish the whole law, as it is very long and contains no les than 44 sections. The inspectors are to be provided by the Secretary of the Treasury with a suitable number of uniform instruments to test the strength of boilers, there will therefore be no excuse for any inspector who may suffer a steamboat to run in his district with a defective boiler. We have heretofore had United States Inspectors of boilers, but they were of very little use. Steamboat companies were well acquainted with the way of removing a conscientious man who stood in their way; we hope, for the sake of humanity and the honor of our country, that the inspectors appointed under this new law will be as sacred men, performing their duties in a sacred manner.

Scientific and Mechanical Institutes.

We have received a communication from a highly respected subscriber and correspondent, in New Orleans, about such an Institution as the "Ecole Centrale," at Paris, where young men are educated in the theory and practice of engineering, manufacturing, and general machinery; he says, if he cannot get his sons instructed at home, in their own land, as he desires them to be, he must send them to France. He requests us to call the attention of our people to this subject. He has no desire to send them to a workshop or foundry, to learn an apprenticeship, as they would not be under the same general admonition and instruction as if under tutors.

It would be a good thing for our country if some complete school of this kind were instituted; at present there is not one, so far as our information extends. The School or Institute should have all kinds of tools and various machines, and students should be instructed how to use the tools—how to make various machines, and thoroughly instructed in the whole theory, while they are learning the practical part. The Lawrence Scientific School, we believe, was intended to embrace such kinds of instruction, but we are not aware of such views having ever been carried out. A new Chair of Civil Engineering, under Prof. Norton, has been established at Yale College; this is a judicious and wise movement in the Yaleites, it shows they are awake to the improvents of the age.

"The Peoples' College,"—that institution which our mechanics are endeavoring to get established under the patronage of the State, is intended to embrace the very system of instruction about which our correspondent has written. We hope the subject will be taken up with a hearty good will by our next Legislature.

A Claimant for the American Reaper.

The Edinburgh Review states that the Rev. Patrick Bell, a Scottish Presbyterian minister of Carmyllie, in Farfarshire, constructed a reaping machine with wheels and scissor blades, in 1825, and that his brother, a farmer, improved it, and cut down his crops with it for a number of years. He got a prize of £50 from the National Society, a number of years ago, and in 1834, several of them were in operation in Scotland. A number of such machines it asserts, were taken to or made in America by emigrants, who saw Mr. Bell's and the one of McCormick and Hussey were but re-productions; and while they were astonishing the people of England, at the Great Exhibition, the old machine of Mr. Bell was quietly cutting down its yearly harvest in the carse of Gourie, in Scotland. We cannot contradict these statements, except so far as if relates to the borrowing of the ideas of Mr. Bell, by Americans. Let us have names and dates for these statements; it is said that some of Mr. Bell's machines were sent to America twenty years ago; if this is true, the names of those who brought them here, or to whom they were sent, can surely be given. Let them be produced, and this will settle the question. It seems culpably strange that there should be a good reaping machine working away in Scotland, and yet the people of England know nothing about it,—nay, that the first knowledge of such machines being in existence, was derived from the sweepingly successful experiments of machines brought from America to the Great Exhibition. The American exhibitors of these machines certainly knew nothing about Mr. Bell's.

Spontaneous Combustion.

Prof. Graham, of London, the able chemist, made a Report to the Lords of the Board of Trade, on the subject of the Burning of the Amazon, which has recently been published in a number of our foreign exchanges. He speaks of the dangerous practice of mixing the various engineers' stores in one room, near the boilers of steamships. Tow or cotton waste, saturated with oil, by exposing much surface to the air, often oxidates rapidly, and heats spontaneously. He has known of olive oil, spilled among saw-dust, doing this; also greasy rags; cloth covered with varnish, &c. Fires in coach-works, oil stores, engine-rooms, &c., have been caused by such means. Ground charcoal and lamp-black, if any oil obtains access to them, should never be admitted as ships' stores. Oil cans, and those containing turpentine, should never be stowed in a warm place, as the liquid expands one volume in thirty, by a rise of 60° in temperature. A moderate heat increases the tendency of coals to spontaneous combustion; coals have taken fire in more than one instance, by being heaped against a heated wall. The covering of wood with iron to protect it from fire, is a dangerous practice, for the iron is a good conductor of heat, and the wood below is heated nearly as much as if it were not covered. Wood, by repeated re-heating, is brought to an extraordinary degree of combustibility, and is liable to spontaneous ignition. Wood has frequently ignited by long contact with iron pipes, which conveyed hot water for heating purposes. Coals should always be taken aboard of a steamboat in a dry state, and as an obnoxious vapor always rises before coals ignite spontaneously, they should at once be turned over when this vapor is noticed. The oil of turpentine gives off a vapor sufficiently dense, when heated to 110°, which, if mixed with air, will explode by contact with the flame of a candle. Newly painted or tarred wood is liable to be ignited very quickly, when exposed to a degree of heat of 212° for some time, and then approached with a lighted lamp. Great care should be exercised by those loading ships, in respect to stores which are liable to ignite spontaneously.

Observatories.

It is proposed to erect an observatory at the Highlands, near this city. We hope the project will be carried out, and that in respect to this plan it will not be said of our city, owing to its gasconading about the Washington Monument a few years ago, "New York is mighty upon everything that makes money, but contemptible in everything else." An association was formed in Brooklyn, two or three years ago, to erect an observatory there, but alas, where is the observatory and where the society now? The subject of an observatory for New York has been talked of so often, that we feel excessively cautious in saying anything at all about the proposed new one. We should have an observatory here, the city is rich enough to maintain the best in the world, but will it do it? that is the question. We hope it will.

The largest achromatic telescope in the world has recently been erected in a new observatory near Leamington, England. It was constructed by a Mr. Craig, an Episcopalian clergyman. The tube is of a cigar shape, is 76 feet long, and is 13 feet in diameter. Mr. Craig will soon turn it on the planet Venus to settle the question whether she has a satelite or not. The Moon seen through it presents a most magnificent appearance, clear and colorless, with her rocks and mountain craters looming up in terrific grandeur.

Safety of Railroads versus Steamboats.

The conclusion cannot be shut out from the mind of any man, that steamboat travelling, in comparison with railroads, is triply dangerous, and wherever the railroad can be chosen in place of the steamboat, it is recklessly criminal not to choose such a means of conveyance. We defy any person to refute the statement, "that more lives have been lost on steamboats, in these United States, during the past three months, than have been lost on all the railroads in our country since the first rail was laid, and that is more than twenty years ago. Many people here profoundly calculated on the certain safety of our North River boats; "they were all low pressure," they said (a mistake, however, many supposing that all condensing engines have low pressure boilers), "consequently there was nothing to fear," but by the burning of one steamboat, and the explosion of the boiler of another, no less than one hundred and ten of our fellow creatures have lost their lives between the cities of New York and Albany in three weeks. The late accident was that of the steamboat Reindeer, which burst a plate of her boiler, by which thirty persons came to an untimely end. There was no carelessness nor defective construction in any part of the boat, so far as human eye could judge; of this we are fully convinced by the testimony of witnesses. The cause of the accident was a bad plate of boiler iron—it had a flaw in its heart. The boiler was made of what is called the best Pennsylvania iron; who was the maker of the iron, we cannot tell, but this we do know, that it is the second explosion from the same cause—a bad boiler plate—which has taken place on New York steamboats this summer. Let us have the names of the makers by all means, so that the public may be made aware of those who make bad work for the endangering of precious lives. In view of the great destruction of life, by steamboat travelling, and even taking into consideration the new Law recently passed by Congress, for the better protection of life, we cannot but advise all who can, to choose the railroad as the safest means of travel, in preference to the steamboat. Of course there have been and will be railroad accidents, but surely, if the past is of any use at all—if we can place any reliance on past events for future guidance—the railroad is assuredly by far the safest medium of modern travel.

Patent Law of the United States Applied to Englishmen.

A correspondent of the London Mechanics' Magazine, signing himself "Justice," calls attention to our present Patent Laws, and the large fees which the subjects of Queen Victoria have to pay for an American patent. All foreigners—Frenchmen, Germans, &c.—are charged $300, Englishmen and all other British subjects are charged $500. This fee was charged to correspond with the patent fees of specific foreign countries. "Justice" hopes that our charge for Britishers will now be reduced, as the English patent fee has been lowered. We advocate its reduction to $300, so as to make all foreigners stand on the same level, but, at the same time, we do not advocate this measure because England has reduced her fees,—they are yet too high.

We do England the justice, however, to say that she makes no distinction between her own and American citizens—all men stand on the very same level before her patent laws. We hope our next Congress will reduce our patent fees, for the subjects of Britain, to $300.

Information Wanted.

Any person knowing the residence of Lauren M. Peck, formerly of Philadelphia, will confer a favor by addressing a note to this office.

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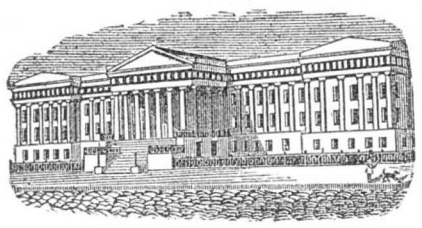

Reported Officially for the Scientific American

LIST OF PATENT CLAIMS

Issued from the United States Patent Office.

FOR THE WEEK ENDING SEPTEMBER 7, 1852.

SMOOTHING IRONS—By F. C. Adams, of Aberdeen, Ohio: I claim, first, the basket grate, formed by the bars, as mentioned.

Second, I claim the concave form in the top of the smoothing portion of the iron, all for the purpose set forth.

MACHINES FOR MAKING CARRIAGE WHEELS—By C. H. Guard, of Brownville, N. Y.; I claim the manner of feeding up the boring spindle slowly, and bringing it back speedily, whilst the driving spindle is turned constantly in one direction, and with the same velocity, viz., by connecting the driving spindle to the boring spindle, by means of the collared bar, and by a cog wheel on the former gearing into a pinion on the latter, and by screw threads, formed upon the said spindles, which can be alternately operated upon by the segmental nut, which is placed between them, and actuated by the lever, substantially as set forth.

REFRIGERATORS OF WORT—By Adolph Hammer. of Philadelphia, Pa.: I claim the series of deep narrow open chamber, when made with vertical partitions, so as to form passages at the bottom thereof, for imparting to the wort a direction downward and upward, through the said chambers, in combination with shallow chambers, with which the aforesaid chambers successively communicate, and the enclosed *h*, through which flows, in a direction opposite to that of the wort, a current of cold water, in the manner and for the purpose set forth.

APPARATUS FOR FEEDING CHICKENS—By Simeon W. Albee, of Walpole, N. H.: I claim attaching and arranging the doors to the case, in such a manner that said doors will open inwardly instead of outwardly, when the fowls tread upon the steps, the doors being attached to the case and arranged as described, or in any equivalent way.

RAILROAD SIGNALS—By Aurin Bugbee, of Charlton, Mass.: I claim the combination of a single bell, a spring, two cords, and two or more trippiug arms or levers, as applied to a railway and supporting frame, at a road crossing of such railway, and so that the contraction of one of the two ropes, by change of temperature, or otherwise, may be counterbalanced by that of the other, and not draw the bell laterally out of place, as it would be likely to, were but one rope or wire used.

And I claim the combination of the weighted or heavy flag, or signal board, with its suspension chains or cords, the windlass barrel, the overbalance weight or weights, and suspension cords or chains, the leading cord passing over the pulley, the tripping lever, the spring catch, and its cord, and the tripping lever or arm, all being arranged and made to operate together, substantially as specified.

PRESERVING INDIAN RUBBER—By Frederick Bonner, of Vera Cruz, Mexico: The nature of my discovery, is by applying the before mentioned quantity of Campeachy salt, or muriate of soda, to the rubber, in its sap state, and that by so doing, to prevent putrefaction and fermentation of the juice, to which, more especially, I confine the claim of my invention.

GRAIN HARVESTERS—By Daniel Fitzerald, of the County of New York N.Y.: I claim, first, the arrangement and combination of two cylinders, with each other, for the purpose of cutting and bringing the cut grain into the middle between them, and delivering the same to the crib, as described.

Second, the construction of the cam cutter, and cam fingers, so constructed as to be drawn in for the purpose of allowing the cylinders to throw the cut grain into the crib, as described.

Third, the use of a sloat or channel, to regulate the movement of the fingers, as described.

Fourth, the arrangement and construction of a crib made to receive from the two cylinders and hold the cut grain upright, so that it can be readily taken out for binding, in the manner described.

SALT—By Jas. P. Haskin of Syracuse, N. Y.: I claim the use of a screen, false bottom, or floor, in the vat or pan, containing saline waters, or brine, for manufacturing salt, to separate impurities or bitterings, from the salt, substantially as described, or any other mode substantially the same.

SULPHURIC ACID—Carl Hinrichs of New York N. Y.: I claim concentrating sulphuric acid in leaden vessels, to the strength of 66 degs. Baume, and at a temperature below the boiling point of the acid.

I also claim the long conducting and escape pipe, in combination with the agitating apparatus for condensing the deleterious gases, and preserving a pure and wholesome air in the neighborhood of the establishment.

[The first claim is a singular one.]

COMPOSITION OF ENAMELS—By J. G Dunn & Alfred F. Howes, of Lawrenceburgh, Ind.: We claim the enamel described, and its application to brick and iron.

APPARATUS FOR HEATING FEED WATER OF LOCOMOTIVES, ETC.—By I. P. Magoon, of St. Johnsbury, Vt: I claim to combine the vessel with the deflector, the heater, and the chimney pipe, substantially as described, whereby such deflector shall not only form the bottom of the said vessel, but that the smoke and exhaust steam may be made to heat said vessel, by impinging against the deflector, as specified.

I also claim the improvement of throwing the steam directly into the heater or vessel, and there partially or wholly condensing it, before it is passed into the tank of the tender, not meaning to claim the throwing of it into the tender, from the blast pipe and through a single pipe connecting the blast pipe and tender, but the combining the tender and the blast pipe, and the heater or vessel, by pipes, substantially as represented, whereby the advantages stated, as well as others, are obtained.

WHIFFLETREE HOOK—By E. A. Palmer & A. J. Simmons, of Clayville, N. Y.: We claim the head, turning upon the shaft, to close the hook, the sliding catch to prevent its opening, and the spring within the head acting upon them, the whole combined and operating substantially as specified.

AIR TIGHT MAIL BAGS—By Chas. A. Robbins, of Iowa City, Iowa, and Harvey Allen, of Allen Grove, Wis.: We are aware that hinged clasps or clamps, have been used for drawing together and keeping closed, the mouth of the bag, such, therefore, merely of themselves we do not claim; but we claim forming the jaws of the clasp with a tongue and groove on their inner faces, for crimping in the elastic material of the bag, and causing it to act as packing, in effectually making air and water-tight the mouth of the bag, as set forth.

BLOW-PIPE FOR DENTISTS, &c.—By J. Thompson, of North Bridgewater, Mass.: I claim, first, the combination in one instrument of the flame of gas, or a lamp, with a blow-pipe, so that both operating together, may be held in one hand, and the flame applied on any spot, in any direction, and for any length of time, at the will of the operator.

Second, the arrangement of the thumb-piece, or its equivalent, in combination with the flame of gas, or a lamp and a blow-pipe, so that while the instrument is held in one hand, a movement of the thumb will adjust the blow-pipe to the flame in such away as to produce any desired variation in the flame, as set forth.

I do not intend by this claim, as I have intimated, to restrain myself to the mode of construction described, but to reserve the right to vary the same as I may deem expedient, while I attain the same ends by means substantially the same.

PREPARING STONE IN IMITATION OF MARBLE—By Hiram Tucker, of Cambridgeport, Mass.: I claim the improvement in preparing the surface of the slate, or absorbent stone, or mineral matter, for better receiving and retaining colors, and for its quicker and better induration, than by the ordinary process of baking oil or japan on it: the same consisting in applying a drying oil, or vehicle, to it as set forth, in combination with baking it and charring it. or with burning it thercon, essentially as specified, the charring or burning the oil, being the principle of my invention or discovery, under the circumstances as stated.

And I also claim the improvement in applying the veining and ground colors to such indurated surface, or other surface, the same consisting in applying the graining colors first, and drying them on, in combination with subsequently covering the whole surface, together with such veining colors with one or more coats of black or other colored japanning, and after the same has been dried, grinding down japanning from the veining colors, and leaving it between them, so as to form a ground as stated.

LAMP TOPS, RIVETS, etc.—By L. C White, of Meriden, Conn.; I claim the method of making lamp tops. stoppers and other similar articles, from a disc or plate of metal, by bending it, and forming it, substantially as described, so that the rim is formed of two thickness of metal, and the centre and flange, of one thickness, as described.

DESIGNS.

MEDALLION OF GENERAL SCOTT.—By Peter Stephenson, of Boston, Mass.

MEDALLION OF FRANKLIN PIERCE—By Peter Stephenson, of Boston, Mass

COAL STOVE—By Wm. L. Sanderson, of Troy, N. Y., (assignor to Reuben R. Finch, Sr., & R. R. Finch, Jr., of Peekskill, N. Y.

Amendment to the Patent Laws.

The following is the only amendment made to our Patent Laws during the late session of Congress:—

AN ACT in addition to an act to promote the progress of the useful arts.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That appeals provided for in the eleventh section of the act entitled an act in addition to an act to promote the progress of the useful arts, approved March 3rd, 1839, may also be made to either of the assistant judges of the circuit court of the District of Columbia; and all the powers, duties, and responsibilities imposed by the aforesaid act, and conferred upon the chief judge, are hereby imposed and conferred upon each of the said assistant judges.

SEC. 2. And be it further enacted, That in case appeal shall be made to the said chief judge, or to either of the said assistant judges, the Commissioner of Patents shall pay to such chief judge, or assistant judge, the sum of $25 required to be paid by the appellant into the Patent Office by the eleventh section of the said act on said appeal.

SEC. 3. And be it further enacted, That section thirteen of the aforesaid act, approved March the third, 1839, is hereby repealed.

Approved August 30, 1852.

Comets.

What are those eccentric wanderers among the starry hosts of heaven? this is a question which philosophy has not yet been able to answer. The friend of Kepler believed them to be the residences of damned spirits, and many other notions nearly as singular have been entertained by various nations and persons. At one time they struck terror into the hearts of all nations, now they are hailed as returning wanderers from unknown journeyings away through the infinitude of space.

The comet comes from regions of unknown remoteness, and rushes, with continually increasing speed, towards the sun. When it has reached within a certain distance of this object, it sways round with fearful impetus, beginning reluctantly to settle out into open space again, and moving with less and less velocity as it goes, until its misty form is once more withdrawn by distance from human sight. When the comet of 1843 swept round the sun in this way, it was so near to the shining surface of the solar orb, that it must have been rushing for the time through a temperature forty seven thousand times higher than any which the torrid region of the earth ever feels. Such as would have been twenty four times more than enough to melt rock crystal. The comet passed this fiery ordeal as the lightning's flash might have done. In two short hours, it had shifted its place from one side to the other of the solar sphere. In sixty little minutes, it had moved from a region in which the heat was forty thousand times greater than the fiercest burning of the earth's torrid zone, into another, in which the temperature was four times less.

The tail of that comet was 170 million miles in length, and one thing very singular about their movement is, that comets always turn their tails prudentially out of harm's way as they whisk through the neighborhood of the solar blaze. Imagine the case of a rigid straight stick, held by one end in the hand, and brandished round through a half-circle.—If the stick were 170 million miles long, the extent of the sweep would be not less than 3,740 million miles! Through such a stupendous curve did the comet of 1843 whirl its tail in two little hours as it rounded the solar orb. Sir John Herschel very beautifully suggests, that the comet's tail, during this wonderful perihelion passage, resembled a negative shadow cast beyond the comet rather than a substantial body. But this suggestion can only be received as an ingenious and expressive hint.

The comet's tail is always thrown out away from the sun, just as the shadow of an opaque body in the same position would be. But this is not all that can be said of it. It is not only cast away from the sun; it is really cast by the sun—shadow like, although not of the nature of shadow. It only appears when the comet gets near to the sun's effulgence, and is lost altogether when that body gets far from the great source of mundane light and heat. It is raised from the comet's body, by the powers of sunshine, as mist is from damp ground. When Halley's Comet of 1682 approached the fierce ordeal of its perihelion position, the exhalation of its tail was distinctly perceived. First, little jets of light streamed out towards the sun, as if bursting forth elastically under the influence of the scorching blaze; very soon these streams were stopped, and turned backwards by the impulse of some new force, and as they flowed in this new direction, became the diverging streaks of the tail. Not only a vapor-forming power but also a vapor-drifting power, is brought into play in the process of tail formation; and this latter must be some occult agent of considerable interest in a scientific point of view, as well as of considerable importance in a dynamic one, for it is a principle evidently antagonistic to the great prevailing attribute of gravitation, so universally present in matter. The comet's tail is the only substance known that is repelled instead of being attracted by the sun.

The comet's tail seems, in reality, to be a thin oblong case of vapor, formed out of the cometic substance by the increasing intensity of the sunshine, and enclosing the denser portion of that substance at one end. As the comet nears the sun, much of its substance is vaporized, but as it goes off again into remoteness, the vapor is once more condensed. The tail may then be seen to flow back towards the head, out of which it was originally derived.

The comet's tail is believed by most astronomers of the day, to be the body converted into vapor by solar influence, and as we know that steam is perfectly colorless and transparent, when unmixed with air, a comet may be composed of a subtile steam vapor. The faintest stars have been seen shining through the densest parts of comets without the slightest loss of light, although they would have been effectually concealed by a trifling mist extending a few feet from the earth's surface.

The belief in the comet's surpassing thinness and lightness is not a mere speculative opinion. It rests upon incontrovertible proof. In 1770 Lexwell's Comet passed within six times the moon's distance of the earth, and was considerably retarded in its motion by the terrestrial attraction. If its mass had been of equal amount with the earth's mass, its attraction would have been so held back in its orbitual progress in consequence, that the year would have been lengthened to the extent of three hours. The year was not, however, lengthened on that occasion by so much as the least perceptible fraction of a second; hence it can be shown, that the comet must have been composed of some substance many thonsand times lighter than the terrestrial substance. Newton was of opinion that a few ounces of matter would be sufficient for the construction of the largest comets' tail.

Comets are supported in the void by the combined effects of motion and attraction.—Their own impetus strives to carry them one way, while the sun's attraction draws them another, and they are thus constrained to move along paths that are intermediate to the lines of the two impulses. Now, when bodies are driven in this way by two differently acting powers, they must travel along curved lines, if both the driving forces are in continued operation, for a new direction of motion is then impressed on them at each succeeding instant.

In most instances, comets move in space, about the sun in ellipses, so very lengthened, that their paths seem to be parabolas as long as the cloudy bodies are visible in the sky. Two of them, Ollier's comet and Halley's, are known to return into sight after intervals of seventy-four and seventy-six years, during which they have visited portions of space a few hundred millions of miles further than the orbit of Neptune. Six comets travel in elliptical orbits that are never so far from the sun as the planet Neptune, and return into visibility in short periods that never exceed seven or eight years. These inferior comets of short periods seem to be regular members of our world system in the strictest sense. Their paths, although more eccentric, are all contained in planes that nearly correspond with the planes of the planetary orbits, and they travel in these paths in the same general direction with their planetary brethren in ~~every case.~~

The comet's motion strikingly illustrate the almost absolute voidness of space. If the thin vapor experienced any resistence while moving, its free passage would be checked, although that resistence was many thousand times less than the hand feels when waved in the air. It is found, however, that Encke's comet does indicate the presence of some such resistence. It goes slower and slower with each circuit, hence the comets have been termed the feelers—nerves of the celestial universe. Encke's comet was retarded for two days in its last orbitual revolution, and upon the basis of this retardation, Prof. Nichols has adopted the theory that the time will come when our system shall cease to exist as it is, and pass into some other form of being. There is a planetary ether, he says, filling the space between the spheres, so that in the course of time Encke's comet will disappear. Whether it will do so or not, the future alone can tell, the idea of the ether filling all space was entertained by Euler in other days, but the cause of the retardation may not be an ether, but some heavenly body. In 1770 Lexell's comet came within the spheres of Jupiter's attraction, and was kept within it for two years, it at last broke away like a wild steed from its charioteer, and since then it hath not again appeared.—Whither it hath gone no one can tell, and whether it will or will not return and visit our system once more is equally beyond the ken of the most profound observer of the starry heavens.

A Railroad in Broadway.

The controversy whether there should or should not be a railroad in Broadway, is still going on in our daily papers. The champions —"Monopoly," and "Anti-Monopoly," are perhaps among the greatest pen warriors the sun ever shone upon; there is no fears of their ever "sheathing their swords for lack of argument; they would have made excellent members of the "Long Parliament," or the last Congress.

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TO CORRESPONDENTS.

J. T. of Ky.—Your obliging favor of the 1st came safe, and each subscriber's name we have duly entered. The sewing machine could not be obtained without the payment of the right to use it. We presume the owners would sell you one upon reasonable terms.

H. B., of Wis.—Yours has been received; you are investigating a deep and intricate question; we are much obliged to you for the interest you take in the Sci. Am.

B. P. of ——.—The idea conveyed in the article on steam, ether, &c., is the same exactly as you express it; we believe it will be so understood, it expresses the "vis viva;" it is the same with a locomotive as a steamboat.

E. F., of N. H.—We do not know anything about the French invention for telegraphing musical sounds. Many strange inventions spring out at the expense of the French nation the snail telegraph for instance.

N. B. L, Ind.—We have never seen a shelling cylinder constructed of sectional plates sustained by spiral springs, and we incline to the opinion that it is new and patentable.

W. M., of Geo.—Almost every milk cart in our city contains such an arrangement for holding up the lines as represented in your sketch. It could not be patented.

J. H., of O.—We have seen rifle barrels with the bore precisely the same as you describe.

A. R., of Mass —Mr. T's invention is very dissimilar to yours, and will not conflict with your application at all.

S. A. L., of N. H.—We cannot answer your questions.

J. F. M., of Phila.—Your interests shall not be neglected.

W. T., of N. Y.—Hon. J. P. Kennedy is the Secretary of the Navy; office Washington, D. C.

S. M., of N. Y.—We transmitted the models of your inventions by the Erie Railroad Express on the 9th inst.

A. C., of Conn.—We have no information about Davidson's scheme not contained in his communication in No. 45. We presume he is not yet ready to publish engravings. $2 received.

F. M., of N. H.—Perhaps the application of the spring in a nice manner, may contribute to the advantage of the engine. Still the power exerted by it must be small. Practice is of course more to be regarded than mere theory.

G. H. P., of O.—Cast-iron cornices are very much in use in this city, and the mere applying them to a new use would not be patentable.

W. S, of O.—The same difference of opinion exists among painters here in respect to the preparation, as probably it does with you.

E. M., of Mass.—For the box of excellent grapes received from you, accept our hearty thanks. In quality we think they excel the Catawbas, and they approach the imported grape nearer than any domestic grapes we have ever tasted.

A. D. B., of Ga.—We have received your letter covering $40, and will ship the slide rest in a very few days.

G. W. of N. H.—We understand your invention exactly, and did at the time we replied to you two years ago. Your invention is not the same as that of Mr. B.'s and we question if *he* gets a patent.

A. M, G., of S. C.—We think we did not misunderstand your plan of car axle. Your suggestions respecting it throw no new light upon the subject.

L. C. B., of Md.—A plan like yours for supplying a current of air to a bedstead, is in use in this city; we would notice it but for its antiquity.

H. C., of Ct.—We do not perceive anything new in your cut-off; in the Practical Mechanic's Journal, Glasgow, Vol. 2 or 3, you will find a cut-off substantially the same as yours.

T. R. K, of Ga.—For your list of subscribers accept our thanks. We do not know anything about the company you refer to, but should think they might have a good invention; we have never seen their apparatus.

Times, N. Y.—The printing telegraph is House's invention, and their principal office is at 21 Wall st., this city.

R. B., of N. Y.—We cannot see any principle in your pistol on which a claim could be secured.

T. W., of Ky.—Your description is not very clear, we simply understand it to be a combination of air with watar forced by a steam engine. We cannot see any advantage to be gained, but a loss, or do you mean to have a water engine constructed like the low pressure steam engine? such engines are not uncommon.

W. B., of N. Y.—In volume 5, Sci. Am., we published a history of propellers, in which is an endless chain of propellers like yours; examine it and judge for yourself.

J. B., of N. H.—A good and simple preventive for incrustations in boilers would be valuable in this country. Your father, however, must try his composition with more than one kind of water, for it is not the filthiest water which forms the worst incrustations. The worst water is clear and sparkling.

C. H. A., of N. Y.—Air is 816 times lighter than water, therefore its buoyant force is equal to that, deducting the weight of the vessel in which it is contained. Air expands from three-eighths of its bulk, from 32 deg. to 212 deg., therefore the elastic force of the air heated would increase as 3-8ths of its bulk, but you could not form a vacuum by any amount of cold.

Money received on account of Patent Office business for the two weeks ending Saturday, Sept. 11:—

T. & M., of N. H., $50; M. & B., of N. Y., $30; A. H, of Ky., $750; E. F., of Ct., $20; M. C, of Ga., $30; J. D C., of N. Y., $30; J. S, of Ohio, $30; J. G., of N. Y., $30; T. C. T., of N. J, $20; J. E, of R. I, $25; W. J. B., of S. C., $55; W. H, of Mass., $55; J. J., of N. J., $30; R. C. B., of N. Y., $30; E. Van C., of Pa., $25; J. W. M., of N. Y., $12; O. D. D., of N. Y., $350; E. O., of N. Y., $25; P. W. LaR. of N. Y., $30; A. F. P., of Mass., $55; H. G, Jr., of N. Y., $30; J. W., of N. Y., $30; H. W. W., of N. Y., $30; C. W. G., of N. Y., $10; W. W. & Co., of Ct., $275; F. I. P., of N. Y., $30; H. & B., of Ohio, $30: W M., of Ga., $14; J. F. J., of N. C., $55; N. B., of R. I., $350; S. I., of N. Y., $30; J. S., of Mass., $30; E. W. N., of Mass., $20; S. M. P., of N. Y., $55; J. D. W., of Pa, $25.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the two weeks ending Saturday, Sept. 11:

J. G, of O; W. H., of Mass; E. F. of Conn.; J. & W. W, of N. Y.; J. F M., of Phila.; J. W. M., of N. Y.; W. M. of Ga.; G. W., of R. I.; W. M., of N. Y.; E. W. N., of Mass.; J. D. W., of Pa.

Back Numbers and Volumes.

In reply to many interrogatories as to what back numbers and volumes of the Scientific American can be furnished, we make the following statement:

Of Volumes 1, 2 and 3—none.

Of Volume 4, about 20 Nos.; price 50 cts.

Of Volume 5, all but 4 numbers, price, in sheets, $1.

Of Volume 6, all; price in sheets, $2; bound, $2,75

Of Vol. 7, all; do do do

Patent Claims.

Persons desiring the claims of any invention which has been patented within fourteen years, can obtain a copy by addressing a letter to this office;—stating the name of the patentee, and enclosing one dollar as fee for copying.

Patent Laws, and Guide to Inventors.

We publish, and have for sale, the Patent Laws o the United States. The pamphlet contains not only the laws but all information touching the rules and regulation of the Patent Office. Price 12 1-2 cts. per copy.

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American and Foreign Patent Agency

IMPORTANT TO INVENTORS.—The undersigned having for several years been extensively engaged in procuring Letters Patent for new mechanical and chemical inventions, offer their services to inventors upon the most reasonable terms. All business entrusted to their charge is strictly confidential. Private consultations are held with inventors at their office from 9 A. M., until 4 P. M. Inventors, however, need not incur the expense of attending in person, as the preliminaries can all be arranged by letter. Models can be sent with safety by express or any other convenient medium. They should not be over 1 foot square in size, if possible.

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A MACHINE SHOP FOR SALE—Complete, containing three lathes, three vises and benches and one forge; with the above are all necessary small tools of every kind for doing a light machine business, together with shafting, belting, and pulleys. All new, running by steam power, and in good order; they will be sold together and at a fair price. Also twenty of the Lowe regulating valves, with the patterns for casting the same. For particulars apply to C. W. ANDREWS, 47 Dey st., rear. 12*

CENTRAL NEW YORK RIFLE CLUB—The Members of this Club will meet according to rule, at Albany, on Monday the 4th day of October, 1852, for the purpose of shooting their Annual Match. The lovers of the Rifle and field shooting, are respectfully requested to attend. Information of the rendezvous and shooting ground can be obtained by applying to S. Van Valtenburgh, Beaver st, Albany.

JOHN R CHAPMAN, Prest.
Oneida Lake, Madison Co, N. Y.

N. B.—Marksmen are reminded that a Rule was adopted at the last Club Shoot, "That all the strings should be made at targets, made of stiff pasteboard," for the purpose of lessening the liability to accident. 1 2*

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1 3* EDWARD HARRISON.

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IMPORTANT TO SOAP MAKERS—Letters Patent of the United States having been issued to Wm. McCord on the 27th of July, for a valuable improvement in Soap, all manufacturers, venders, and users are hereby cautioned against the use of Kaolin, or other equivalent aluminous minerals, combined with ammonia, as they will, by so doing, infringe this patent, and subject themselves to prosecution. All the necessary fixtures for making 2000 lbs. per day, will cost not to exceed $75; two persons only required to attend the manufacture. Rights to manufacture this the most valuable soap, are offered for sale on reasonable terms. Apply to WM. McCORD, 141 Sullivan st., N. Y. 47tf

WARRANTED CAST STEEL—About 30 tons assorted sizes, warranted quality cast-steel, to close the sale of a special lot; it is particularly adapted to machinists use, and will be sold in lots of 500 lbs. and upwards, at 33 1-3 per cent. less than cost or price of the best imported. Amongst the sizes are square, 1-2, 5-8, 7-8, 1 1-8, 1 1-2, and c. flat. 1 by 3 8, 1 3 8 by 1-2, 1 1-2 by 1-2, 1 1-2 by 3-4, 1 1-4 by 5-8. Also small and large sizes: also rolled 1 1-8 by No 4, 1 1-4 by No 4 wire gauge. Round 5-16, 7-16, 9-16, 5-8; it is well worth the attention of consumers. JOHN W. QUINCY, 81 John st. 49 4*

A RARE CHANCE—TO MACHINISTS—Assignee's sale of Machinists' Tools: these tools have been in use about four months, and consist of Planers, Lathes, Drill Presses, and Universal Chucks, which are for sale from 20 to 25 per cent. less than cost. For particulars address (post-paid) JOHN PARSHLEY, New Haven, Ct. 49tf

IRON FOUNDERS MATERIALS—viz.: good American Pig Iron—grey, mottled and white; No. 1 Scotch Pig Iron, of favorite brands. Pulverized Sea Coal, Anthracite Charcoal, Soapstone, and Black Lead Facings. English and Scotch patent Fire Bricks—plain, arch, and circular, for cupolas. Fire Sand and Fire Clay. Iron and brass moulding sand; Core sand and flour; always on hand and for sale by G. O ROBERTSON, 135 Water street (corner of Pine), N. Y. 47 6*

PATENT ALARM WHISTLE.—Indicators for speaking pipes, for the use of hotels, steamships, factories, store-houses, private dwellings, etc. etc. This instrument is intended to supersede the use of the bell, being more simple in its arrangement, more effective in its operation, and much less liable to get out of order, being directly connected with the speaking pipe, it requires no lengthy wires in its use, which are continually getting out of order or breaking. There have been several hundreds of them fitted up in this city and vicinity with the greatest success. They can be attached to pipes, which are already fitted up without damage to buildings, and for much less than the cost of a bell, and warranted to operate. The public are invited to call and examine them at the factory of the patentees.

WOOLCOCKS & OSTRANDER,
57 Ann street, New York.
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CAUTION—Whereas, certain persons are manufacturing and selling Fan Blast Separators, or Winnowing Machines, which infringe upon my patent, which was issued on the 8th day of April, 1851. This, therefore, is to caution all persons against purchasing any right or privilegas of any person whose machine conflicts with mine, as set forth in my Letters Patent, whether their machines have been patented subsequent to mine, or not covered by Letters Patent, as I shall hold every trespasser of my rights to strict account. Any person holding powers of attorney from me, which have not been legally recorded, are cautioned against disposing of territorial rights, or manufacturing and selling machines, and the public are likewise cautioned against purchasing rights of such persons. J. L. BOOTH, Patentee, Cayuga Falls, Ohio. 50 5

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CHAS. W. COPELAND, Consulting and Mechanical Engineer, Surveyor of Steam Machinery, &c., No. 64 Broadway, N. Y., superintends the construction of steam vessels, steam engines, and machinery of every description; specifications and contracts prepared; also general plans and drawings in detail furnished. Steam engines surveyed and valued, and condition reported. Mr. C. also acts as agent for the purchase and sale of steam vessels, steam engines, boilers, &c. Steam and Vacuum Gauges, Indicators, Sewell's Salinometers, etc, etc., on sale. 50 5eow*

IMPORTANT TO IRON FOUNDRIES—The Galvanic Alloy Manufacturing Co., Nos. 401, 403, and 405 Cherry st., N. Y., will furnish the Aerostatic Fan Blower at $55, and with patent fitting at $65, that produce sufficient blast for the largest cupola, melting 3 and 4 tons of iron per hour; taking less than one half the power of those now in use, that cost from $80 to $100. The wings, being only about an inch in width (planned upon entirely new and mathematical principles), produce double the blast with half the power of other blowers. Warranted in all cases, or they may be returned and the money refunded. 38 eowtf.

BEARDSLEE'S PATENT PLANING MAchine, for Planing, Tonguing and Grooving Boards and Plank.—This recently patented machine is now in successful operation at the Machine shop and Foundry of Messrs. F. & T. Townsend, Albany N. Y.; where it can be seen. It produces work superior to any mode of planing before known. The number of plank or boards fed into it is the only limit to the amount it will plane. For rights to this machine apply to the patentee at the abovenamed foundry—or at his residence No. 764 Broadway; Albany. GEO. W. BEARDSLEE. 23tf

MACHINERY.—S. C. HILLS, No. 12 Platt-st. N. Y. dealer in Steam Engines, Boilers, Iron Planers, Lathes, Universal Chucks, Drills; Kase's, Von Schmidt's and other Pumps; Johnson's Shingle Machines; Woodworth's, Daniel's and Law's Planing machines; Dick's Presses, Punches and Shears; Morticing and Tennoning machines; Belting; machinery oil, Beal's patent Cob and Corn mills; Burr mill and Grindstones; Lead and Iron Pipe &c. Letters to be noticed must be post-paid. 1tf

MECHANICS' INSTITUTE CLASSES—Classes in Architecture, Mechanical, Ornamental, and Perspective Drawing: also in Ornamental and Figure Modelling, Geometry, and Algebra, will be commenced at the Rooms of the Institute, corner of Bowery and Division st., on Monday evening, Oct 4th, 1852. The course will consist of 20 lessons. Terms, $4; to Members of the Institute $1 per term less. Further information may be obtained from the Actuary, at the Rooms, from 10 A. M. to 10 P. M.

JOHN T. FISHER, PETER GRANT, JOHN LOUDON—Committee. 51 5*

LEONARD'S MACHINERY DEPOT, 109 Pearl-st. and 60 Beaver, N. Y.—Leather Banding Manufactory, N. Y.—Machinists's Tools, a large assortment from the "Lowell Machine Shop," and other celebrated makers. Also a general supply of mechanics' and manufacturers' articles, and a superior quality of oak-tanned Leather Belting.
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TO INVENTORS—The subscribers will enter into arrangements, on the most reasonable terms, for furnishing Drawings, Patterns, and Models, believing that they have one of the most thorough and scientific men, in that line of business, to be found in New York. Their object is merely to fill up time, they not having sufficient work of their own to keep him in steady employment, and do not like to have him leave for fear they could not obtain his services when required. Apply at Dunlop's Manufacturing Emporium, No. 36 Gold street.
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PAINTS, &c. &c.—American Atomic Drier Graining Colors, Anti-friction Paste, Gold Size, Zinc Drier, and Stove Polish.

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LOGAN VAIL & CO., No. 9 Gold street, New York, agents for George Vail & Co., Speedwell Iron Works, have constantly on hand Saw Mill and Grist Mill Irons, Press Screws, Bogardus' Horse-Powers, and will take orders of Machinery of any kind, of iron and brass; Portable Saw-mills and Steam Engines, Saw Gummers of approved and cheap kind, &c. Gearing, Shafting, large and small, cast or of wrought iron. 11 1y

NEW HAVEN MANUFACTURING COMpany, Tool Builders, New Haven, Conn., (successors to Scranton & Parshley) have now on hand $25,000 worth of Machinist's Tools, consisting of power planers, to plane from 5 to 12 feet; slide lathes from 6 to 18 feet long; 3 size hand lathes, with or without shears; counter shafts, to fit all sizes and kinds of universal chuck gear cutting engines; drill presses, index plates, bolt cutters, and 3 size slide rests. The Co are also manufacturing steam engines. All of the above tools are of the best quality, and are for sale at 25 per cent. less than any other tools in the market. Cuts and list of prices can be had by addressing as above, post-paid. Warehouse No. 12 Platt st., New York, S. C. HILLS, Agent N. H M'f'g Co. 45tf

TO STEAM ENGINE BUILDERS, OWNERS, and Engineers.—The subscriber having taken the agency of Aschroft's Pressure Gauges, would recommend their adoption to those interested. They have but lately been introduced into this country, but have been applied to many of our first-class river and ocean steamers, and on many railroads, on all of which from their simplicity, accuracy, and non-liability to derangement, they have given the utmost satisfaction. CHAS. W. COPELAND, Consulting Engineer, 64 Broadway, N. Y. 50 5*

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SCIENTIFIC MUSEUM.

Oxygen.

This substance is indispensable to all vital activity, and yet most mysterious in its actions and effects. In a quiescent state it forms part of the solid muscle, which, if unattacked by outside chemical agents, would endure as long as the granite rocks; and yet, strange to say, it is another portion of the same element, in an active state, which constitutes the outside chemical agent by whose action the muscle is decomposed, and made one of the most shortlived of organic compounds. Again, oxygen is indispensable to all manifestation of animal or vegetable life, and yet the process by which it brings out such manifestations, is purely one of decay and dissolution!

Oxygen gas constitutes 21 parts in 100 of the air we breathe. It was, when first discovered, called vital air. It also constitutes eight-ninths, by weight, of water. In every nine pounds of water there are eight pounds of this gas, very much condensed of course, because it has taken on the fluid state.

Carbonic Acid.

When coal, wood, or other substance containing carbon, is brought to a very high heat in the presence of oxygen, combustion, that is chemical union, ensues. The two materials combine; heat, light, motion, and electricity are evolved during the process; and the product is another colorless gas, which is carbonic acid. This gas is proved to be an acid by its pungent taste, its effect in changing a vegetable blue color to red, and by its combining with alkalies and other oxides forming some of the class of compounds called salts. The diamond being nearly pure carbon, burns up, producing this acid gas.

In chemical union, bodies combine only in certain fixed proportions, or given weights. Thus, 1 lb. of hydrogen always combines with 8 lbs. of oxygen, or with twice that weight. So, too, with 14 lbs. of nitrogen, 8, or 16, or 24, or 32, or 40 lbs. of oxygen combine, but no quantities between these. The lowest weights in which these bodies united are termed their combining numbers, or equivalents.

The equivalent of oxygen is 8, that of carbon, 6.

Now in the formation of carbonic acid, we find one equivalent of carbon united with two of oxygen. Hence the symbol for this gas is CO^2. This is the gas which is emitted by the respiration of animals, volcanization, and it exists solid in many of the metal ores.

Red River.

Capt. Marcy has been on an exploring expedition to the head waters of Red River. He has followed the North Fork, the Middle and the South Fork of the Red River to its source, about forty miles from Anton Chicot, in New Mexico.

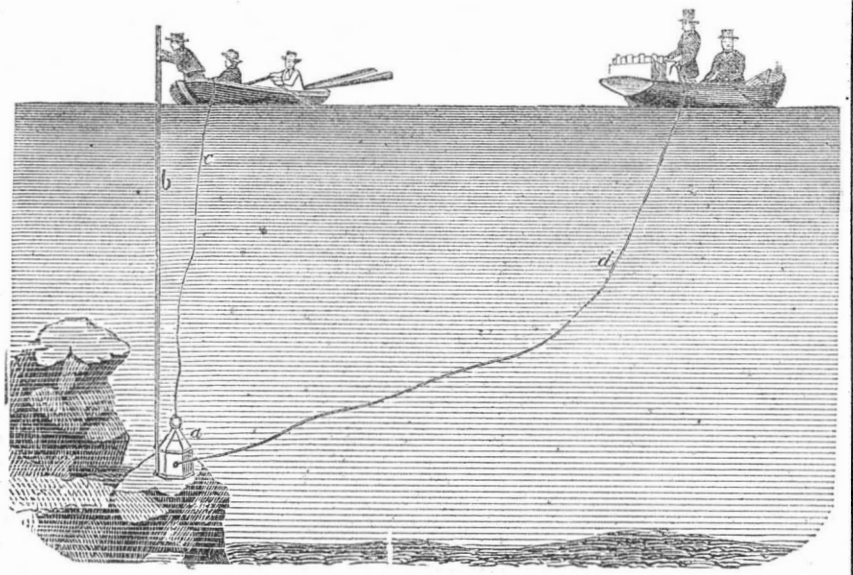
In some places he found the South Fork a river half a mile wide, but partaking very much of the character of the Platte—shallow, with a sandy bed, and much of it, except when high, uncovered by water. For two hundred and fifty miles from Arbuckle, west, the country is represented as the finest in the world for farming purposes. The land is well timbered, with oak, pecan, and other fine trees; the atmosphere pure and healthy as the mountains of New England, and inviting the emigration of the white man. Very soon they will be found there.

Game of every kind is abundant, and the command had excellent sport in killing bears, panthers, antelopes, buffaloes, &c. The water of the Red River, in parts explored by this expedition, has been condemned on account of its salty taste, and it has been generally supposed that there were large beds of salt towards its sources, but this is found not to be the case. The presence of gypsum, in large bodies, high up the river, is supposed to give to the water this peculiar flavor, as above these points the water is very pure and agreeable.

Rare Curiosities.

Purser Ramsey, of the U. S. Navy, has recently brought from Brazil a number of very elegant head-dresses for ladies, which, in their material and fabric, may justly claim a place among the curiosities of the age. Many of them are made of the scales, eyes, and bones of fish, in the form of flowers, beautifully arranged into wreaths and boquets, while others are made up of the feathers of birds of the most brilliant plumage, rivalling the hues of the far-famed birds of Paradise. Several of the ornaments represent delicate little birds in the most natural postures while others are made of the breasts of humming birds, surrounded by leaves made of parrot's feathers, forming gorgeous flowers, of variegated hues, of the most beautiful description. These orments are made by the nuns of one of the convents of Brazil.

BLASTING ROCKS UNDER WATER.



The annexed engraving is an illustration of what is termed "Mons. Maillefert's Invention for Blasting Rocks under Water without Drilling." A patent was granted for this method of blasting rocks on the 2nd of last March (1852,) and at the time we published the claim, we directed attention to what we deemed an act of injustice in granting a patent to a person for an invention that is public property. As our remarks have not yet been answered, we must still look upon that act as an unjust one. After describing the method of blasting we will proceed to give our reasons for entertaining such sentiments. The figure in some part of a channel or harbor exhibits a dangerous rock, which it is desirable to remove; how shall this be done, is the question? The common way of blasting is to drill a hole in the rock, put in a charge of powder, and ignite it; the expansion of the powder rends the rock into fragments, and it can then be removed, or if it is like Pot Rock at Hell Gate (so happily removed by Mons. Maillefert, and for which we give him due credit) with a deep basin round its seat, the fragments will fall down, fill up the whirlpool and not require to be removed, by grapnels or cranes and nippers. Hitherto such rocks were drilled by men going down in diving bells, and the blasts used to be ignited through long tubes, until the discovery of igniting them by the electric spark was made. The new method ignites the blast with the electric spark as before, but the rock is not drilled, the charge of powder is merely set in a crevice or fissure part of the sunk rock in a canister, and then ignited with the electric spark from a galvanic battery. The question may be asked, how can this process burst a rock? The answer is, "the superincumbent stratum of water above the charge, as a medium of resistance to the expansion of the powder, acts like a lever, whereby the force of the powder is made to strike the rock like a monster hammer in the hands of a quarryman."

a is a canister of powder which has a loop on its neck, by which it is slid down upon the rock, on the guide pole, *b*; it is carefully lowered by a person having hold of the rope, *c*. In the other boat is the person who is to ignite the charge. This is done with a galvanic battery, *e*, having a long circuit wire or conductor, *d*. This wire is double, that is, it is disconnected at the battery, as shown in the figure, and it is also broken at the end in the canister of powder, where it is to ignite the charge, when the circuit is closed, as is well known to electricians. The conductor, *d*, is a double wire, and is inserted through the canister into the charge, and the opening closely sealed. If a wire forming an electric circuit is broken, the current ceases to flow at once, but if the broken points of the wire are brought near together, a spark will be observed to pass at the broken point; this is the way the charge is ignited in the canister. The circuit of the battery, *e*, is now broken; the wire to connect the two poles is shown to be disconnected; whenever the operators who are adjusting the canister, get all things secured and in proper order, they row away to some distance, when the person in the other boat ignites the charge in the canister, *a*, by connecting the wires which branch from the two ends of the battery, *e*. The water rises by the explosion to the height of nearly 100 feet, and appears like the sudden upburst of a huge spouting fountain. The charges employed for blasting have been about 100 lbs. of powder each, but the size of the charge depends entirely upon the amount of work to be done.

In the channel between New York or Manhattan, and Long Island, which communicates with the Long Island Sound, there existed a dangerous rock near Harlem, which created a whirlpool, bearing the not very polite name of Hell Gate. This small whirlpool, immortalized in the "Water Witch" of Cooper, lies in the direct channel of vessels going from New York, in that direction to the Atlantic. No large ship dared to face such a dangerous passage. That whirlpool has ceased to roar, and is no longer a terror to our coasters. For this all thanks are due to Mons. Maillefert, a French engineer; he has spoiled future romancing about the terrors of Hell Gate, and although it may still bear the old name, it will only be like an old tale of ghost or ghoule. The above engraving shows the method of blasting by which Pot Rock was disintegrated and reduced in height; the debris from the top of the rock fell down around the base, which being of great depth from the top, did not require to be removed, but helped to form a partial breakwater in filling up the gulley of the whirlpool. A number of rocks in the same channel must be removed before it can be called safe for vessels; we hope this will be done soon, for the expense of doing so, in comparison with the benefits conferred upon the commerce of New York, is as nothing.

Let us now say a few words about the history of the invention. We are grateful to Mons. Maillefert for introducing and showing its practical workings in this country, but at the same time, he is not the original inventor, according to the evidence before us, and he should not have been granted a patent; Capt. Fisher, R. N., Harbor Master of London, introduced this method of blasting, for the removing of obstructions in channels, in 1845. In the Illustrated London News of May 2nd, 1845, there are engravings of the process successfully carried into effect, by Capt. Fisher, for the removal of a shoal in the Thames channel. In the same paper of Jan. 8th, 1848, there are illustrations of the process successfully carried into effect by the same gentleman for blowing up another shoal. The plan of Capt. Fisher is fully illustrated in the Illustrated News, and there is not a shade of difference between it and that practiced by Mons. Maillefert. Now, as this invention was made public property more than 7 years ago, and every civil engineer should know this, how came it to pass that a patent was granted in the month of March last? This system of blasting is illustrated in Hunt's Merchants' Magazine of this month, and is there described as the invention of M. Maillefert. It is not to be expected, that the editor of that magazine should search up and discus the question of priority of invention—that is not his business, but when we illustrate an invention, it is expected of us that we should know something more than common about it. We have therefore quoted, as it were, chapter and verse, so that any person can examine for themselves the authority we have adduced, and see whether we have said aught that is incorrect. We hope, however, that as M. Maillefert has been the successful introducer of this plan of removing obstructions in channels of rivers, &c., that he will be extensively employed and liberally rewarded; he has already done the State much service.

New Chain Machine.

The Boston Journal describes an ingenious machine recently set in operation there for making small link chains. It cuts out the wire the requisite length for a double eye, then it turns it over and links it to another length, thus turning the links, and doubling them alternately, one with the other, until the whole length of the chain is completed.

MECHANICS

The present Volume of the SCIENTIFIC AMERICAN commences under more favorable auspices than any of its predecessors. The amount of subscriptions is double that received within the same period on any former occasion. Aside from all other considerations, we regard it as a flattering testimonial of the usefulness and popularity of the publication so generously supported. We are greatly indebted to our readers for much valuable matter, which has found a permanent record on its pages. The aid thus contributed has been most important to our success, and we are grateful for it.

From our foreign and home exchanges—from the workshops, fields, and laboratories of our own country, we have supplied a volume of more than four hundred pages of useful information, touching every branch of art, science, and invention, besides hundreds of engravings executed by artists exclusively in our employ.

We shall strive to improve the present Volume both in the quantity and quality of the engravings, and in the matter—selected and original. Having every facility for obtaining information from all parts of Europe, through our correspondents, we shall lay before our readers, in advance of our cotemporaries, a full account of the most prominent novelties brought forward.

The opening of the Crystal Palace, in this city, next May, will form an interesting subject for attention. We shall study it faithfully for the benefit of our readers, and illustrate such inventions as may be deemed interesting and worthy.

The Scientific American is the Repertory of Patent Inventions: a volume, each complete in itself, forms an Encyclopedia of the useful and entertaining The Patent Claims alone are worth ten times the subscription price to every inventor.

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